World Petroleum
OCTOBER, 1951
ONE DOLLAR PER COPY
FIVE DOLLARS PER YEAR

Some features of
LANE WELLS
Drillable
BRIDGING PLUGS
Tomorrow's Tools—Today!
and
what they do
for you!
GREATER
CLEARANCE
means
FASTER RUNNING
IN FLUID
BIG
INTERLOCKING SLIPS
mean
POSITIVE
SETTING
LONGER
SELF-SEALING
ELEMENT
means
LEAK-PROOF
PACKOFF
TOUGHEST
MATERIALS
OUTLASTS CASING
IN PERMANENT
INSTALLATIONS
ADVANCED DESIGN
RESISTS PRESSURE UP OR DOWN
(holds differential
pressures up
to 10,000 p.s.i.)
REMOVABLE
RAM ADAPTER
means
FAST KNOCK-OUT
(Plug can be drilled
out in 4 to 6 hours)
Ask Your
Lane-Wells
Man!

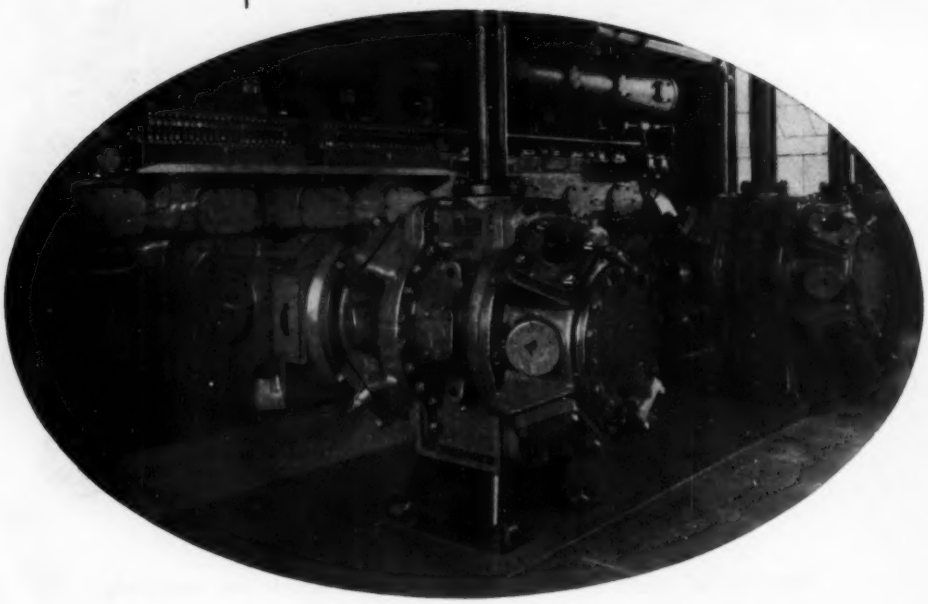
Unique

"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

Insure dependable performance
of pipe-line compressor units,
reduce maintenance costs
with **Gulf Security Oil**



You make a two-way savings when your pipe-line compressor units are lubricated with Gulf Security Oil—lower maintenance costs, less out-of-service time.

Gulf Security Oil provides outstanding protection for bearings and cylinder walls in both engines and compressors. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without appreciable change in its original properties. And because oil control rings are kept clean, oil consumption is remarkably low.

Many operators of units lubricated with Gulf Security Oil report that this quality oil insures more operating hours between overhauls and helps them avoid unscheduled shutdowns. And Gulf's delivery service is tailored to meet the needs of every pipe-line operator.

For complete information on Gulf Security Oil and for expert help on any lubrication problem, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pa.

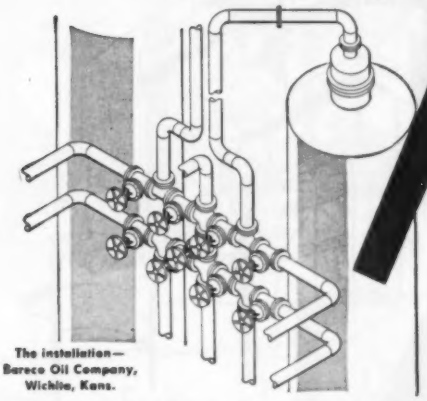
FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS

WORLD PETROLEUM for October, 1951. Vol. 22, No. 11, October, 1951. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 2 West 45th St., New York 36, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00. Copyright, 1951.

for outstanding service

on Gasoline Desulfurization

...for example



The installation—
Bareco Oil Company,
Wichita, Kans.

PROBLEM: To select valves that would stay absolutely tight on hot gasoline, steam-air mixture, and catalyst regeneration waste gases, for control manifold to reaction chambers on Perco Cycloversion unit.

WORKING CONDITIONS: Cyclic operation; approximately 15-day cycles. At oil inlet, straightrun gasoline handled at 950 Deg. F., 85 psi. For catalyst regeneration, air-steam mixture at 850 Deg. F., 15 psi. Regeneration waste gases, 1200 Deg. F., 5 psi.

SOLUTION TO PROBLEM: Crane 8-inch, 300-Pound, No. 5 Chrome-Molybdenum Alloy Steel Wedge Gate Valves, with Stellite seats and patented flexible disc design.

RESULTS: After more than 2 years' service, all Crane valves are absolutely tight and operating at highest efficiency, with no maintenance.

ANOTHER TYPICAL CASE HISTORY, demonstrating the low ultimate cost of Crane Valves of every type. And the reason why...
More Crane Valves are used than any other make!

...Equip with Dependable Quality CRANE VALVES

300-Pound Cast Steel Wedge Gate Valve. In body and trim materials for all refinery services. See your Crane Catalog.

CRANE CO.

General Offices:
Crane Co.,
836 S. Michigan Ave.,
Chicago 5, Illinois, U.S.A.

In Canada:
Crane Limited,
1170 Beaver Hall Square,
Montreal, Quebec

In Great Britain:
Crane Ltd.,
45-51 Leman St.,
London E. 1, England

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

it's the results that count!

Top results are insured through the uniform quality of Davison synthetic fluid-type cracking catalysts. Years of experience and research make it possible for Davison to better control physical characteristics and maintain chemical purity of their catalysts. Your requirements can now be supplied in either microspheroidal (M-S*) or ground (DA-1*) form . . . both available in various average particle sizes.

The Davison "D" also stands for dependability. Likewise, you can depend on Davison facilities for the development and production of catalysts for your specific processes.

*T.M.T.D.C.C.

Progress Through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, PHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS

What's In it For You... And 150,000,000 Others?

America has a multitude of independent inventors, many of whose best ideas are lost to the public for lack of money and technical help. The Sinclair Plan offers these inventors, having useful, patent-protected ideas for new oil products, the use of the Sinclair research laboratories . . . without cost.

Since the Sinclair Plan was announced we have had thousands of letters calling it "revolutionary", "progressive", "public-spirited", and "an outstanding example of the value to this country of the private enterprise system."

We hope the Sinclair Plan will help many inventors make their dreams come true. But beyond that, its major purpose is to provide new and better petroleum products to the 150,000,000 people in America who rely on oil for countless services that contribute to better living.

The oil industry is highly competitive. The Sinclair Plan is an instance of how this competition, in the best traditions of the American economic system, stimulates new ideas that are good for everybody.

SINCLAIR
A Great Name in Oil

SINCLAIR OIL CORPORATION • 600 FIFTH AVENUE • NEW YORK 20, N. Y.

ALUMINUM

FABRICATION BY GRAVER

EXCELLENCE OF TECHNIQUE REFLECTED IN REPEAT ORDERS

The skillful workmanship and rigid quality controls which produced three Graver-built aluminum bins — specially designed for the process system of a large organic chemical plant — are evidenced by a recent re-order.

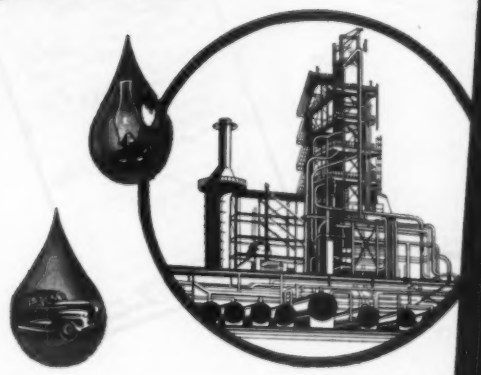
This is another example to verify the fact that industries of many types rely on Graver for precision and precaution in alloy fabrications. It also indicates the excellence of Graver workmanship — both in the shop and in the field.

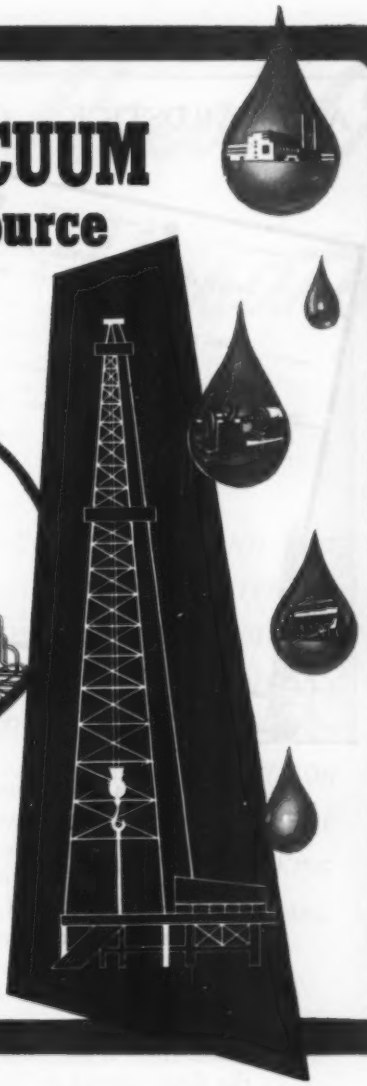
GRAVER TANK & MFG. CO., INC.
EAST CHICAGO, INDIANA
NEW YORK • CHICAGO • PHILADELPHIA • WASHINGTON
DETROIT • CINCINNATI • CATASAUQUA, PA.
HOUSTON • SAND SPRINGS, OKLA.

Aluminum Bin — 12' dia. x 31'3" long fabricated by Graver for Gulf Coast chemical plant.

STANDARD-VACUUM

the dependable source for all petroleum products





STANDARD-VACUUM powers, fuels and lubricates the planes, ships and trains... the trucks, tractors and automobiles... industrial machinery, stoves, boilers, lamps, and every other petroleum-using device.

Yes, millions of people throughout the Eastern Hemisphere rely upon STANDARD-VACUUM and its affiliated companies—and have, for over half a century.

STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

26 BROADWAY, NEW YORK 4, N.Y.

AUSTRALIA • BURMA • CEYLON • HONG KONG • INDIA • INDO-CHINA • INDONESIA
JAPAN • KENYA • MADAGASCAR • MALAYA • NEW ZEALAND • PAKISTAN • PHILIPPINES
PORTUGUESE EAST AFRICA • RHODESIA • SINGAPORE • SOUTH PACIFIC ISLANDS
SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

BY ANY YARDSTICK... CEMENTING PRICES ARE LOW

Many things have happened since the invoice and job ticket reproduced above were written.

The man who signed the job ticket as cementer—W. R. McClendon—is now president of Halliburton Oil Well Cementing Company.

Wells have gone deeper and the price of everything we eat, wear or use has gone up according to the government's Consumers Price Index, which now stands at 185 plus.

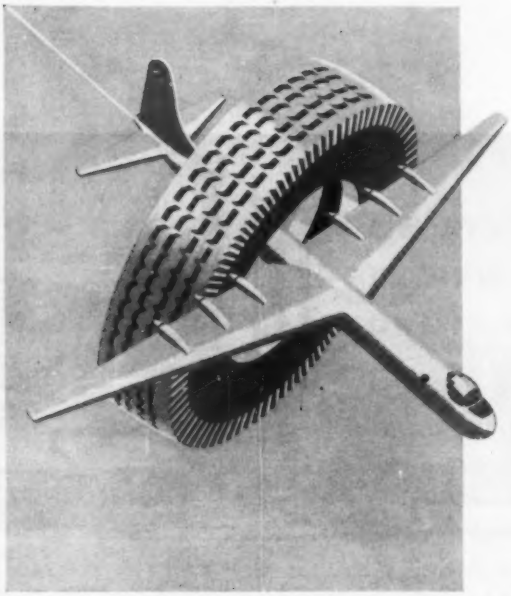
But there is one item that is actually LESS today than the figure shown in this long-ago invoice of August 24, 1924—the cost of the average cementing job.

By any yardstick, Halliburton cementing prices are low.

Erle P. Halliburton

Chairman of the Company

HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma



Need $C_4^=$ Unsats?

THE SKYROCKETING DEMAND FOR SYNTHETIC RUBBER RAW MATERIALS AND AVIATION GASOLINE HAS PLACED A PREMIUM ON THE UNSATURATED C_4 FRACTION OF REFINERY PRODUCTS. FILTROL* CATALYSTS ARE AVAILABLE FOR GIVING MAXIMUM YIELD OF BUTYLENE (C_4) FROM THE CATALYTIC CRACKING OPERATIONS. WRITE FOR PARTICULARS.

OTHER
REASONS FOR USING
FILTROL CATALYSTS

1. HIGHER OCTANE BARRELS
2. VARIED PLANT FACILITIES
3. LOW COST
4. SULPHUR RESISTANT CATALYSTS
5. FASTER REGENERATION RATE
6. LOW ATTRITION
7. TECHNICAL SERVICE
8. UNIFORMITY
9. LOWERED EXCESS BUTANE

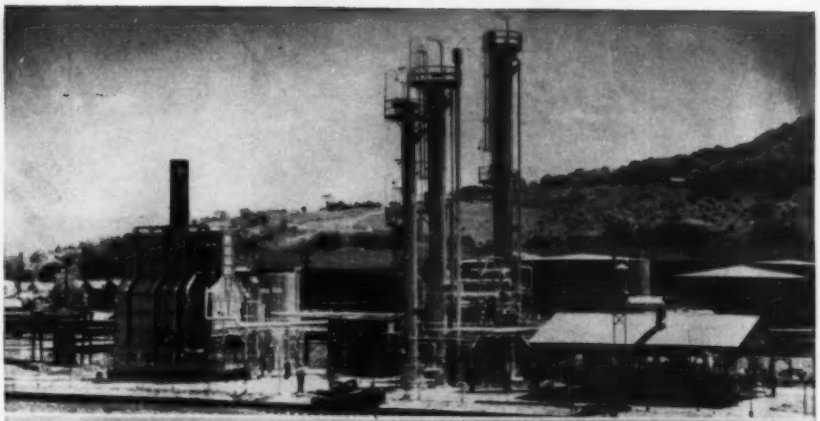
FILTROL CORPORATION

OFFICES: 727 WEST SEVENTH ST., LOS ANGELES 17, CALIFORNIA
PLANTS: VERNON, CALIF.; SALT LAKE CITY, UTAH; JACKSON, MISS.

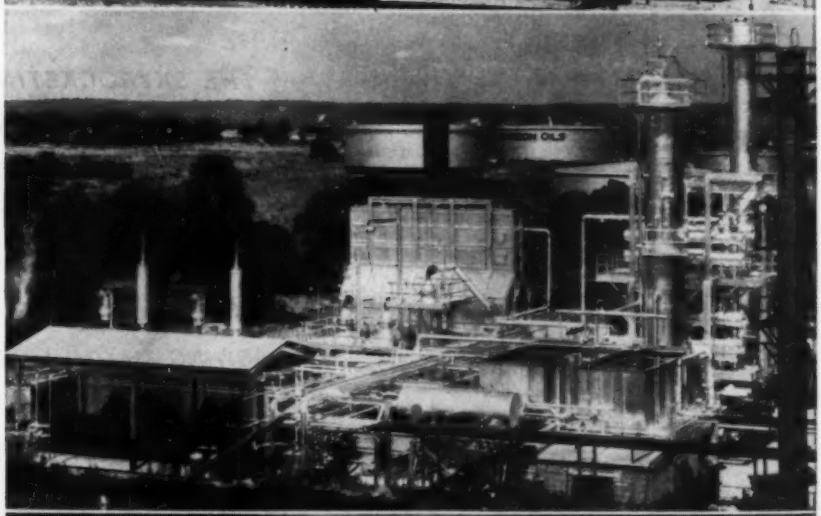
Filtrol

CATALYSTS AND ADSORBENTS

*T. M. REG. U.S. PAT. OFF.



KENDALL REFINING CO.
Bradford, Pa.



JOHNSON OIL REFINING CO.
Cleveland, Okla.

MIDWEST REFINERIES, INC.
Alma, Michigan

NOW ON STREAM... THREE NEW UOP PLATFORMING UNITS

On stream in less than a year from the date the contracts were signed . . . the new Kendall, Johnson, and Midwest Platforming Units provide proof of Procon resources and skill.

Even though defense requirements presented definite problems, Procon was able to procure materials and equipment without serious delay . . . and having ample manpower and construction facilities available, quickly completed the jobs.

BUILT BY PROCON

Staffed and equipped to handle any process construction job, Procon offers a *complete service* to the petroleum refining and petro-chemical industries. If your plans call for new construction or expansion of existing facilities, discuss your requirements with Procon.

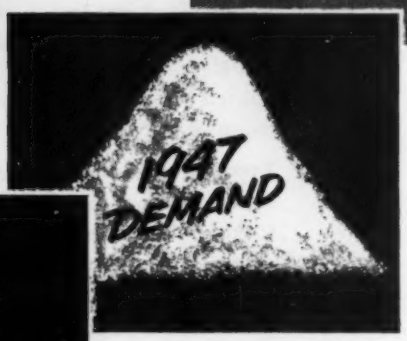
PROCON *Incorporated*

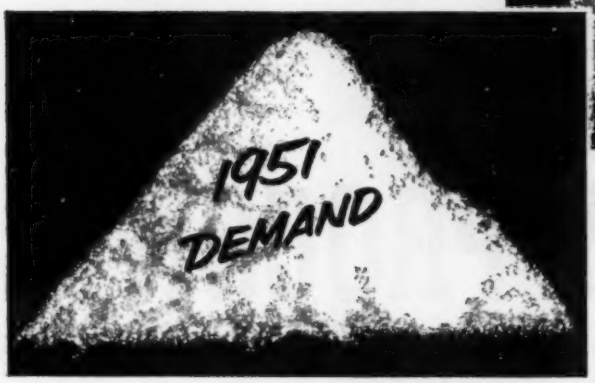
PROCESS CONSTRUCTION

75 EAST JACKSON BLVD., CHICAGO 4, ILLINOIS

In spite of record output

Sulphur is SHORT





For the first time since World War I, sulphur is in short supply . . . a condition which promises to continue and to affect the products of many industries.

Commercial sulphur in quantity is just one advantage of this method for removing H_2S

SULPHUR IS A MARKETABLE and profitable side-product of the Shell Phosphate Process for dependable, low-cost removal of H_2S in the presence of large volumes of CO_2. Since the recovered H_2S is of relatively high concentration, it can be converted to solid sulphur or acid at very low cost.

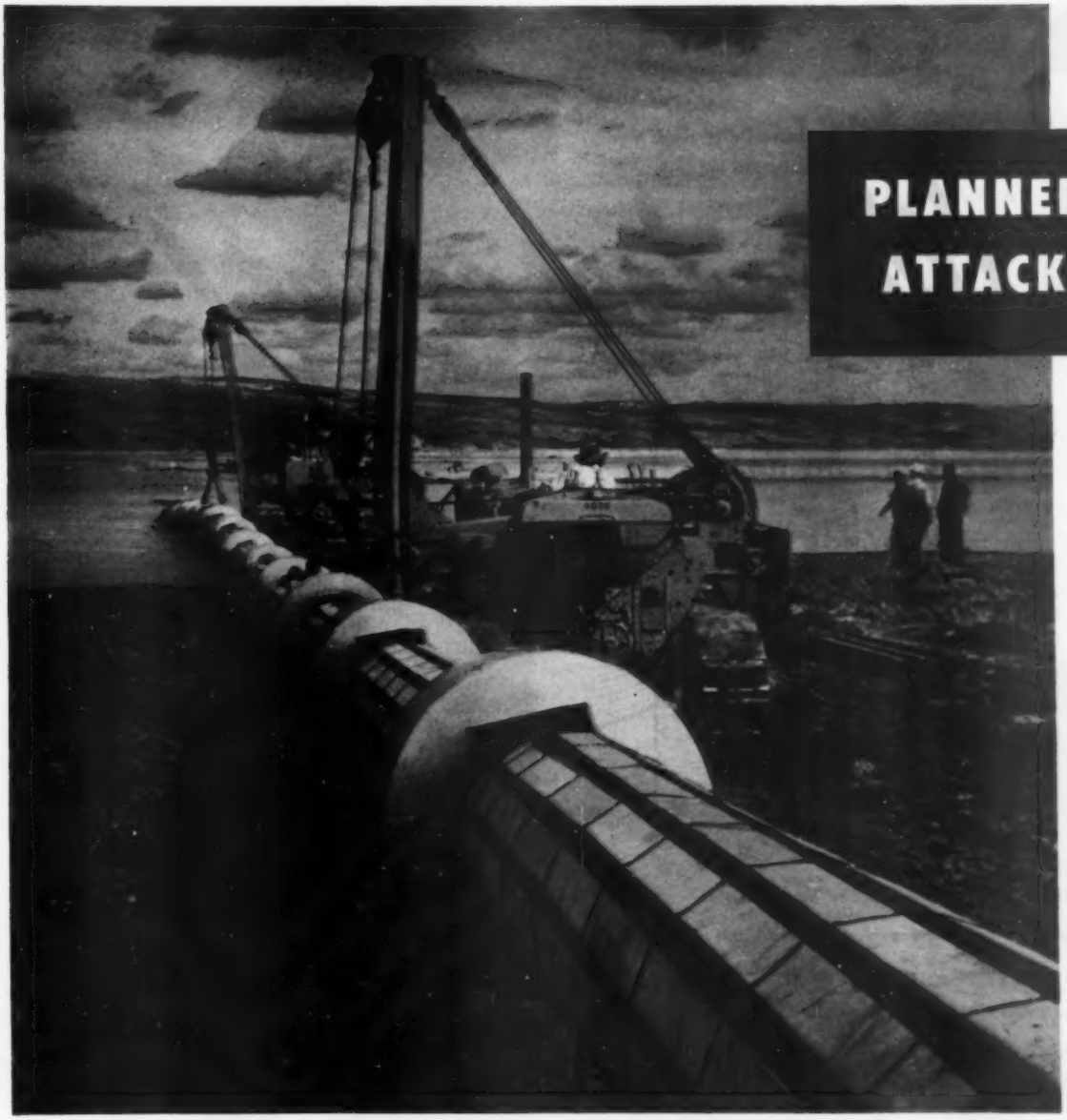
This treating process has no harmful effect upon subsequent refining operations. The treating agent is inorganic . . . non-contaminating to hydrocarbons.

The Shell Phosphate Process is outstanding for its low operating costs. All but harmless amounts of H_2S are removed while most of the CO_2 is left untouched.

The Shell Phosphate Process is available to any operator under license from the Shell Development Company . . . together with experienced engineering service for its design, and operation.

SHELL DEVELOPMENT COMPANY
50 WEST 50TH STREET • NEW YORK 20, N. Y.

SHELL



BECHTEL

• ENGINEERS
• CONSTRUCTORS

Come what may—river, mountain or desert—the pipe line goes ahead, meeting tight schedules.

Thorough planning, spreads engineered to fit job conditions and crack teams under experienced leadership are reasons why . . .

Bechtel builds faster.

BECHTEL CORPORATION

"BUILDERS FOR INDUSTRY"

Los Angeles • **SAN FRANCISCO** • *New York*

We've lost count!

The number of drums made by Moon machines must have reached astronomical figures. Whether large or small, for light work or heavy duty, every drum is sound and strong, and made with a speed and efficiency for which Moon machines are famous.

MOON

Regd. Trade Mark

LONDON OFFICE: Abbey House, 2/8 Victoria Street, Westminster, London, S.W.1., England
Cables: Moonbro, Sowest, London, England

MOON BROTHERS LIMITED, BEAUFORT ROAD, BIRKENHEAD, ENGLAND

Cables: "Moonbro" Birkenhead, England

AGENTS IN U.S.A.: M. Neumunz & Son Incorporated, 90 West Street, New York 6, New York

AGENTS IN CANADA: Dominion Welders & Machinery Ltd., 322 Lumsden Avenue, Toronto 13

MAKERS OF TIN BOX AND DRUM MAKING MACHINERY

dm MB 48

"We hear a lot about the American way of life, and the essential dignity of man. Faith in our fellow men is the only basis on which each and every one of us can live in that democratic principle. Suspicion of our fellow men generally—or any section of our fellow men—is incompatible with the dignity and aspirations of men in a free society."

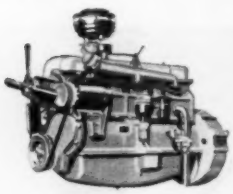
From a speech by Frank W. Abrams, Chairman of the Board, Standard Oil Company (New Jersey)

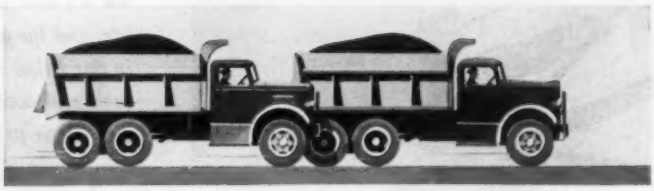
STANDARD OIL COMPANY (NEW JERSEY)

AND AFFILIATED COMPANIES

How antiknock compound increases the working and earning power of heavy-duty vehicles:

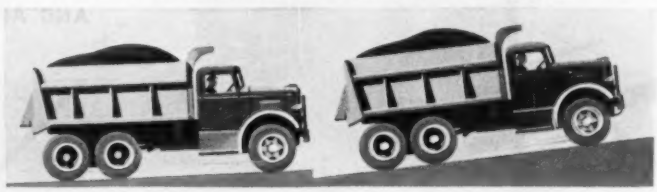
It is estimated that, in normal times, the quantities of antiknock compound used in gasoline increase its antiknock quality about 10 octane numbers. Such an improvement allows an increase in engine compression ratio which, in one commercial vehicle engine, produced gains in power output and fuel economy that resulted in:





. . . 18% faster acceleration with the same load

. . . 76% more pay load and 7% better gasoline mileage on the same operating schedule over a route through level and hilly country



. . . 16% higher speed on mountain grades

ANTIKNOCK COMPOUND

A few drops in each gallon of gasoline is helping trucks and buses climb hills more easily, haul heavier loads and step up schedules

When a modern truck or bus parks alongside an old-timer, you don't have to be an automotive expert to tell which is which. The advances in design and construction are readily apparent. But one of the most important improvements of all is hidden from you. It's inside the gasoline tank.

For more than twenty-five years refiners have constantly improved their gasolines. Automotive manufacturers have taken advantage of the improved antiknock value of such gasolines by developing higher compression, more efficient engines. During this period an engine of given size has produced more and more power and steadily improved gasoline economy. Actually today *two* gallons of gasoline can do the work of *three* gallons of 1925 gasoline—yet the price per gallon, excluding taxes, is about the same.

What has made it possible for refiners to economically produce vast quantities of greatly improved gasoline? First, the development of new and better refining methods which provide higher octane-base gasolines. Second, the addition of antiknock fluid to these better base stocks, which improves them still further.

In normal times, the use of antiknock fluid adds an average of about ten octane numbers to gasoline used in the U. S. Without this antiknock fluid, neither gasoline quality nor commercial-engine performance would be at their present levels. When you consider the role that trucks and buses must play in America's defense program, antiknock fluid today is a product of top-ranking value and importance.

ETHYL CORPORATION, New York 17, N. Y.

Manufacturers of "ETHYL" antiknock fluid

SERVICE LEDGER
1901-1951

ANGLO-IRANIAN OIL CO. LTD.
ARGENTINE GOVERNMENT OIL FIELDS
ARGENTINE MINISTRY OF WAR
ATLANTIC REFINING CO.
ATOMIC ENERGY COMMISSION
BRITISH AMERICAN OIL CO. LTD.
CANADIAN OIL REFINERIES, LTD.
CALIFORNIA REFINING CO.
CHAMPLIN REFINING CO.
CIE. DE RAFFINAGE SHELL-BERRE
CIE. FRANCAISE DE RAFFINAGE
CIE. INDUSTRIELLE DES PETROLES
CITIES SERVICE OIL CO.
CITIES SERVICE REFINING CORP.
COLGATE-PALMOLIVE-PEET
CONSOLIDATED REFINERIES, LTD.
CONTINENTAL OIL CO.
CORY BROTHERS & CO., LTD.
CREOLE PETROLEUM CORP.
DIAKEL CORPORATION
EL DORADO REFINING CO.
ESSO STANDARD OIL CO.
GENERAL PETROLEUM CORP. OF CALIFORNIA
GLOBE OIL & REFINING CO.
GULF OIL CORP.
HUMBLE OIL & REFINING CO.
IMPERIAL CHEMICAL INDUSTRIES
IMPERIAL OIL LTD.
KANOTEX REFINING CO.
KENDALL REFINING CO.
LEVER BROS.
LION OIL CO.
MAGNOLIA PETROLEUM CO.
MARINE OIL REFINERS OF AFRICA, LTD.
MATHIESON CHEMICAL CORP.
McCOLL-FRONTENAC OIL CO., LTD.
MID-CONTINENT PETROLEUM CORP.
MITSUBISHI OIL CO., LTD.
NATIONAL PETROLEUM COUNCIL OF BRAZIL
PAN AMERICAN REFINING CORP.
PENNZOIL CO.
PHILLIPS PETROLEUM CO.
POLYMER CORP., LTD.
PURE OIL CO.
SHELL CHEMICAL CORP.
SHELL OIL CO.
SHERWIN-WILLIAMS CO.
SINCLAIR REFINING CO.
SKELLY OIL CO.
SOCIETE DES RAFFINERIES DE PETROLE DE LA GIRONDE
SOCIETE GENERALE DES HUILES DE PETROLE
SOCIETE INDUSTRIELLE BELGE DES PETROLES
SOCONY-VACUUM FRANCAISE
SOCONY-VACUUM OIL CO.
E. R. SQUIBB & SONS.
STANDARD OIL CO. (INDIANA)
STANDARD OIL CO. (OHIO)
STANDARD OIL CO. OF CALIFORNIA
SWIFT AND CO.
TEXAS CO.
UNION OIL CO. OF CALIFORNIA
UTAH OIL REFINING CO.
WASATCH OIL CO.
WOOD RIVER OIL & REFINING CO.

Building for product improvement ...with Mid-Continent!

First order from the Mid-Continent Petroleum Corporation, in 1939, was for lube improvement units... deasphalting and acid treating. The following year we were busy again, this time in the gasoline end of the operation, engineering and constructing Mid-Continent's first catalytic polymerization unit.

As part of its immediate post-war operations, Mid-Continent ordered a Kellogg Fluid catalytic cracker to lift the overall refinery octane level... and this unit went on stream in 1949. Then just last year Kellogg engineered an alkylation unit for this refiner... a unique one inasmuch as it was designed to run in process series with Mid-Continent's modernized cat-poly unit. This operating technique squeezes the maximum volume of high octane fuels from the gaseous by-products of other refinery processes.

THE M. W. KELLOGG COMPANY
A SUBSIDIARY OF PULLMAN INCORPORATED

for fifty years an integral part of processing history

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

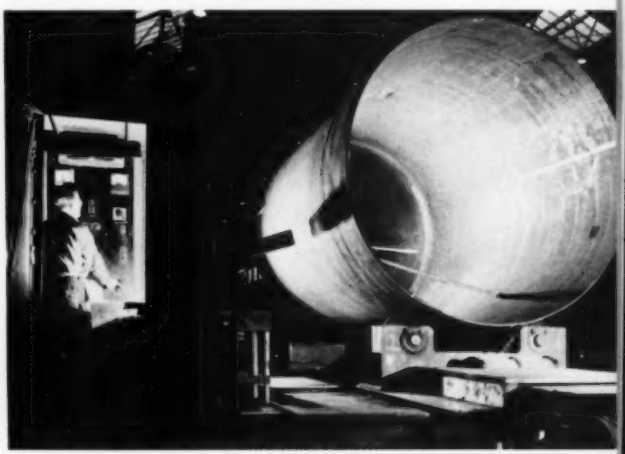
Portrait at

This year is Kellogg's fiftieth of service to industry. At this time naturally, as a group of men—known collectively to the modern business world as The M. W. Kellogg Company—we can think back nostalgically. We can remember the chimney stacks

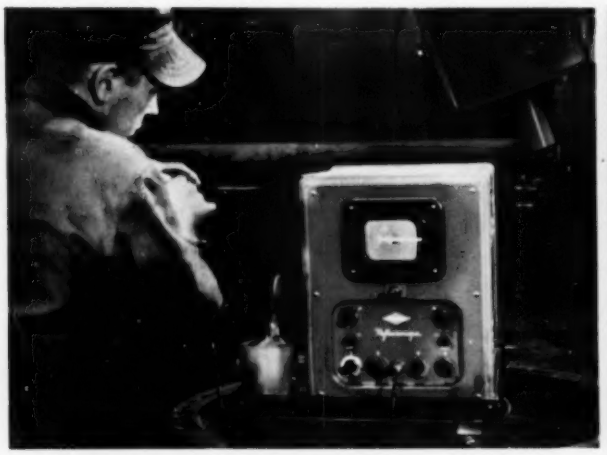
"Unusual Techniques Set High Quality Level..."

In previous issues of this magazine, "camera portraits" of M. W. Kellogg today have highlighted major aspects of Kellogg's broad research, development, engineering and procurement activities . . . and introduced readers to the company's fabrication facilities.

This month, the camera continues its tour of Kellogg's Jersey City Shops, focusing particularly on some unusual techniques employed by Kellogg to maintain the highest quality in fabricated process piping and equipment.



1. *OUR COMPANY WAS ONE OF THE FIRST* fabricators to adopt radiography in its Shops as a quality check—and early developed one of the most extensive radiographic operations in the industry. Beyond utilizing this method as a positive check on specific jobs, Kellogg employs it to evaluate new welders and also to maintain daily welding operations at a high quality level.



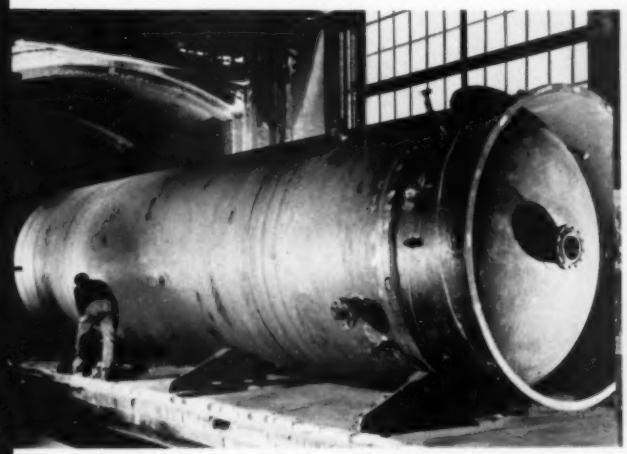
4. *A RECENT INNOVATION* in shop procedure for the fabrication of critical power station piping is the ultra-sonic testing of "raw" pipe. Developed in conjunction with a leading turbine manufacturer, this application of a modern testing technique should prevent the costly failures that have occasionally occurred because of internal flaws that cannot be discovered by any other practical method.

5. *AS FAR AS SIZE IS CONCERNED*, the Shop's facilities for making process piping are virtually unlimited. Pictured is one of industry's first machines for continuous longitudinal welding of the interior of pipe. The use of advanced equipment is typical of Kellogg shops . . . in fact, almost every step in fabrication is accompanied by either exclusive techniques or exclusive equipment.

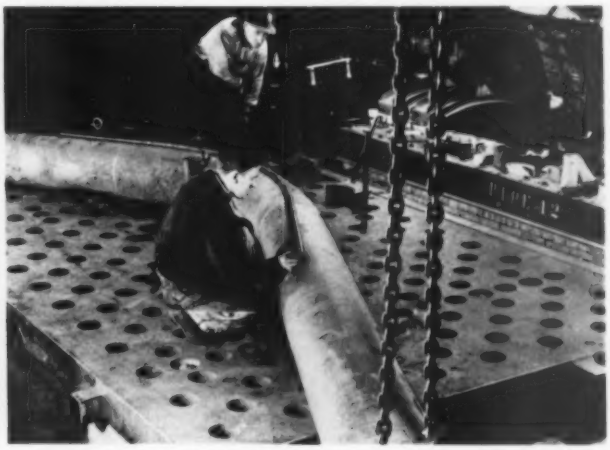
Fifty... no. 9

KELLOGG
1901-1951
50th Anniversary

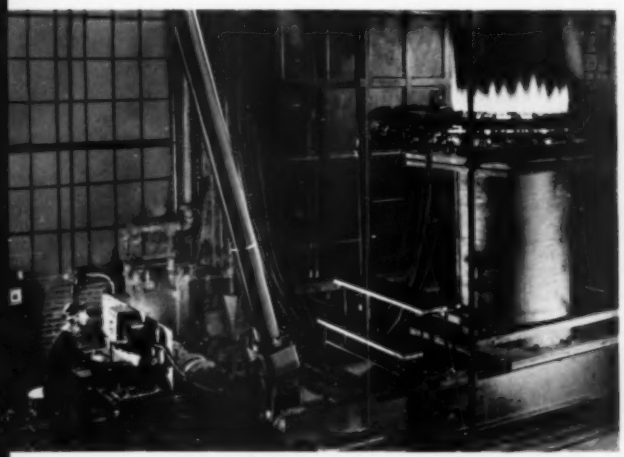
we built in 1901 . . . the first crude vessels for oil refiners in the 'teens . . . our first combination unit . . . the forty-odd Fluid cat crackers built in these years. But, after all, The M. W. Kellogg Company is only a factor as it is able to serve industry today. For that reason, we are presenting this series of monthly camera studies which document our belief that a truly integrated organization can better serve industry to achieve greater earning power. This is No. 9 in the series.



2. *STRESS RELIEVING FURNACES* are a basic element of the Shops' facilities. However, from this more-or-less routine shop operation, Kellogg metallurgical groups have evolved special stress relieving "specs" and techniques that have proved invaluable in the field—both in fabrication of vessels and in the installation of piping systems for power and process applications.



3. *PROCESS PIPING OF ALL TYPES* represents a major part of the Shops' volume—with high-temperature, high-pressure piping systems for utility power stations also being an important phase of Contract-Engineering volume. Some recent Kellogg firsts in this latter highly specialized field are the first installation to operate at 1050°F and 1730 p.s.i.g. and the first stainless steel alloy installation.



6. *THIS KELLOGG INVENTION* can bend process pipe up to 96 inches in diameter . . . with continuous, even contour. Operated through electrical controls, the machine produces giant pipe bends that have promoted processing efficiency by minimizing erosion and stress corrosion and markedly reducing turbulence.

7. *ON THIS MACHINE, KELLOGG* fabricated the first 30 inch O.D. diameter alloy corrugated piping through use of much the same technique as employed on the Giant Bender: controlled incremental heating and subsequent controlled application of pressure.

NEXT MONTH

. . . in the tenth of this series of camera studies of M. W. Kellogg today . . . the camera completes the Shop story and moves out on the construction lot to review some of the methods Kellogg employs to win "construction's battle with time."

Low maintenance...welded in!

M. W. KELLOGG

Such details as the positioning of this simple weld on an exchanger baffle plate can radically vary maintenance costs of an operating exchanger. Low maintenance costs have been a design fetish of Kellogg engineers for many years. They design with low maintenance as a principal "spec"... then see that the "spec" is reproduced in every piece of Kellogg-fabricated equipment.

Pressure Vessels
Vacuum Vessels
Fractionating Columns
Drums and Shells
Heat Exchangers
Process Piping
Hi-pressure—Hi-temp Power Piping
Bends and Headers
Giant One-Piece Bends
Forged and Welded Fittings
Radial Brick Chimneys

Continuing Basic Study of heat exchange by Kellogg development groups over 20 years has produced unduplicated design data.

Shop Layout Craftsmen have had experience on all types of heat exchangers, from marine condensers to jet engine combustion-chambers.

Rigid Quality Control is maintained by inspectors reporting directly to *Shop Management* rather than to *Production* executives.

Extensive Shop Facilities, from plate forming to stud threading, permit *complete* fabrication of any type heat exchanger.

Special Shop Techniques—the component parts of each exchanger are fabricated as a production unit, building in the advantages of "tailor-made" fit.

NEWS FOR OPERATORS IN WESTERN CANADA!

The Canadian Kellogg Company Ltd. has established complete shop facilities for the fabrication of all types of piping at **EDMONTON**, Alberta. Inquire directly or through any Kellogg or Canadian Kellogg office.

The M. W. Kellogg Company *(A Subsidiary of Pullman Incorporated)* **New York, Jersey City, Los Angeles, Tulsa, Houston, Toronto, London, Paris**

Every Engineer...

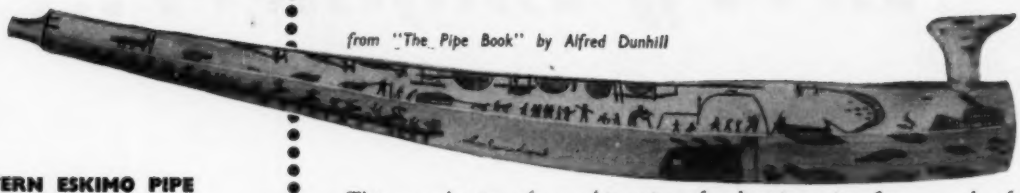
Every engineer who is concerned with the pumping of fluids or gases should possess a copy of this Gland Service Recommendation Chart. Over 150 fluids and gases are listed, and appropriate gland packings are indicated on the accompanying charts.

If you have not already received a copy, please send your name and address to us and we will forward a copy to you.

Crane Packing LTD OF SLOUGH ENGLAND
A COMPANY

PIPES with a difference . . .

NUMBER SIX



from "The Pipe Book" by Alfred Dunhill

WESTERN ESKIMO PIPE

This reproduction of a smoking pipe of walrus ivory is a fine example of Eskimo art. The scratched drawings are beautifully executed and show a house with chimney, a flag-staff, a herd of tame reindeer, and a large fishing net in use behind the igloo. The boring of the stem has been effected by cutting out a series of oblong panels, subsequently fitted back into place; the pipe can be cleaned by removal of a panel.

INDUSTRIAL PIPING AND ITS HEAT INSULATION

The industrial pipe must be efficiently insulated.

KENYON are prepared to undertake all heat insulation of piping, vessels, plant or equipment, from start to finish. Projects carried out in every part of the world.

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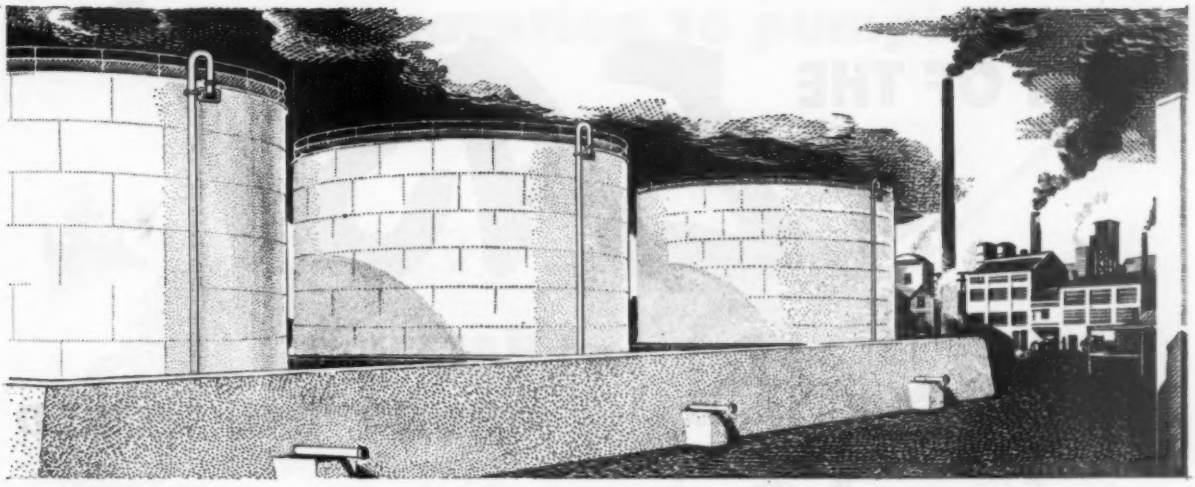
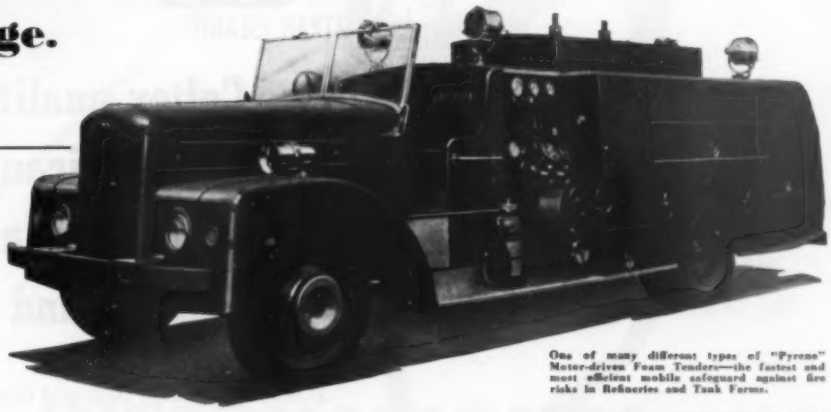
KENYON *Planned* HEAT INSULATION

H. K. 105



Modern fire protection for refineries and tank storage.

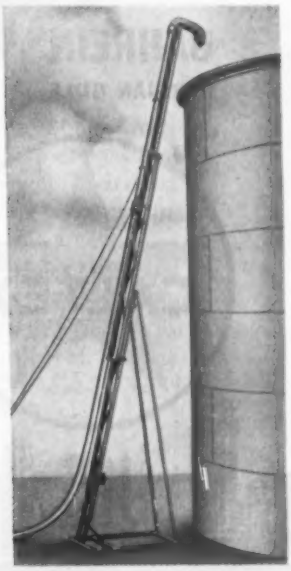


One of many different types of "Pyrene" Motor-driven Foam Tenders—the fastest and most efficient mobile safeguard against fire risks in Refineries and Tank Farms.

The production and processing of oil in all its various phases involves many different fire dangers, each of which can be successfully overcome with one or other of the range of "Pyrene" Fire Appliances. Some of the latest forms are shown here, including one of the latest Pyrene Foam Tenders, an impression of a fixed Foam Installation, a "Pyrene" Portable Foam Tower and the P.D.20 Extinguisher. Amongst other notable "Pyrene" Equipment for fighting oil and spirit fires are Mechanical Foam Generators and Foam-making Branchpipes. Those responsible for fire safety in the Oil Industry may benefit by the experience and research of our Engineers and Chemists who will be pleased to give free and impartial advice on these fire problems.

The P.D.20 CO_2 Dry Chemical Fire Extinguisher—"the fastest ever"—is shown on left. It smothers smaller outbreaks involving oils, spirits, alcohols, etc., in 2 or 3 seconds.

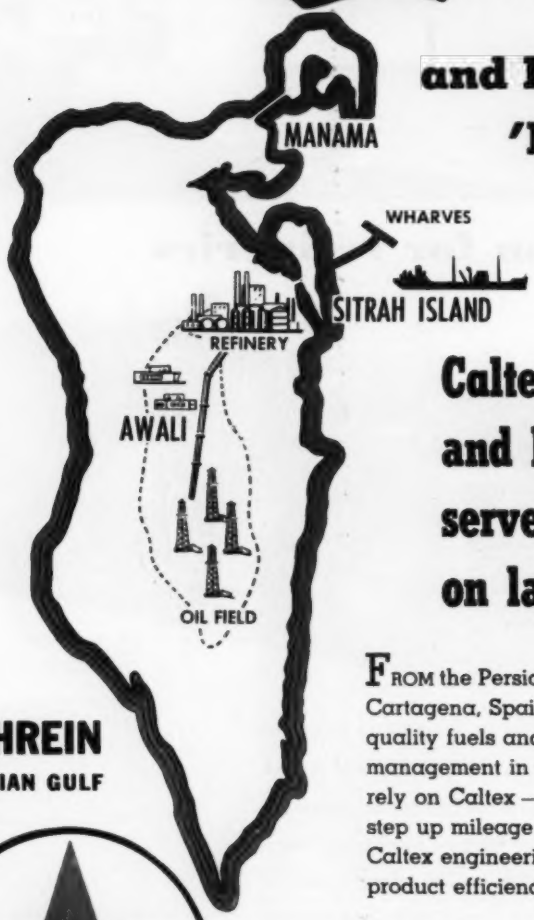
Pyrene TRADE MARK FIRE PROTECTION



Illustrated here is one of the range of "Pyrene" Portable Foam Towers—this model can readily be handled by two men.

Write at once for full details to Dept. WP. 10: **THE PYRENE COMPANY LIMITED,**
9, GROSVENOR GARDENS, LONDON, ENGLAND. *Cables: Pyrene-London.* Associated with:—Pyrene Manufacturing Company, Newark, N. J., U.S.A. and Pyrene Manufacturing Company of Canada, Ltd., Toronto, Ontario, Canada.

OUT OF THE EAST and HALFWAY 'ROUND THE WORLD



BAHREIN
PERSIAN GULF

Caltex quality fuels and lubricants to serve all that moves on land and sea

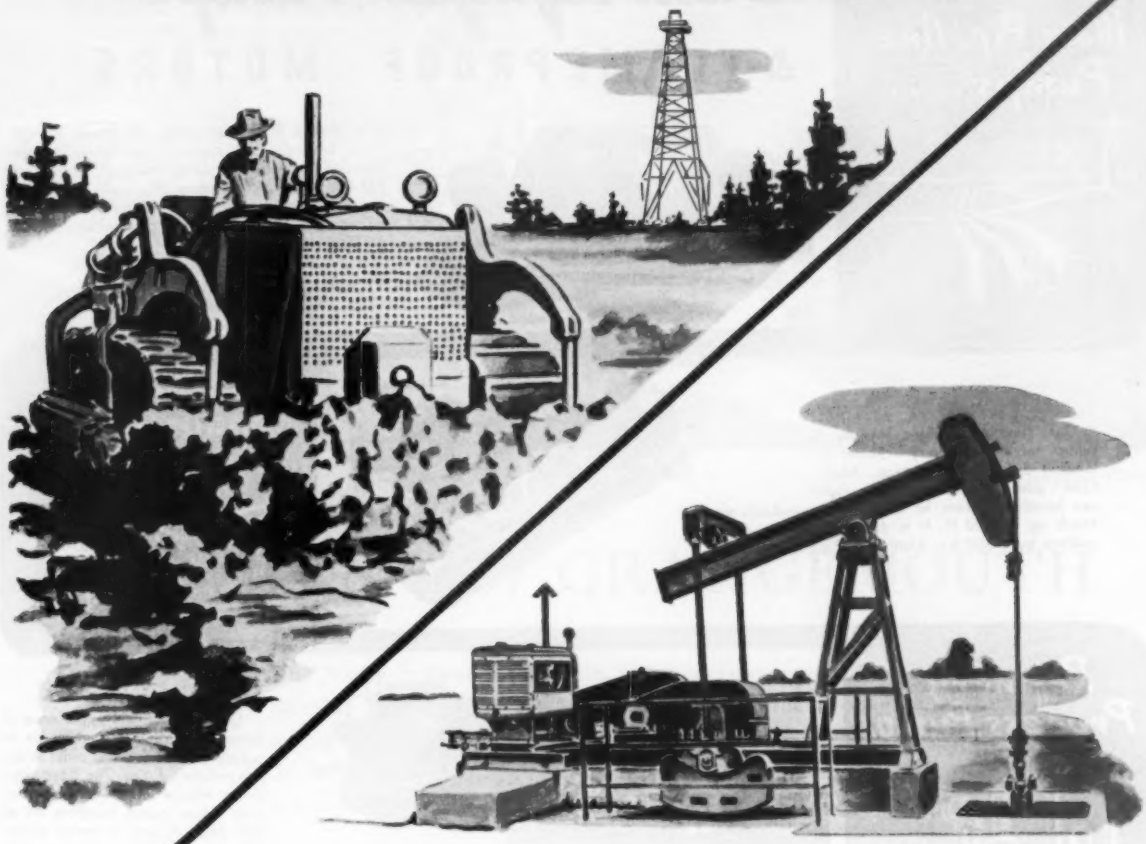
FROM the Persian Gulf and from refineries in Bordeaux, France, Cartagena, Spain and Rotterdam, Holland come Caltex quality fuels and lubricants. Industry and transportation management in many lands throughout the eastern hemisphere rely on Caltex – to boost production – maintain schedules – step up mileage – increase payloads and operating profits. Caltex engineering service sees to it that the promises of product efficiency and economy are realized.

CALTEX
REG T.M.

CALTEX PETROLEUM PRODUCTS

SERVING EUROPE...AFRICA...ASIA...AUSTRALASIA

From preparation to pumping...



...with INTERNATIONAL

• You'll find International Industrial Power working in every phase of the oil industry. Clearing and leveling ground for the rig site, delivering power for the drilling operation, hard at work manning the pumps. Wherever tractor or stationary power is required, specify International . . . and be safe in the knowledge that dependability has already been proved on thousands of oil field installations.

International Industrial Power includes:

A full line of crawler and wheel tractors designed to handle every oil field transportation and earthmoving need.

Diesel engines ranging up to 180 net working horsepower and combination gas-gasoline engines with up to 49 horsepower for drilling, generating electricity, pumping and powering pump jacks.

Your International Industrial Power Distributor can supply you with complete facts. In addition, he offers you a single source for all types of allied tractor equipment. International Harvester Export Company, 180 N. Michigan Ave., Chicago 1, U.S.A.

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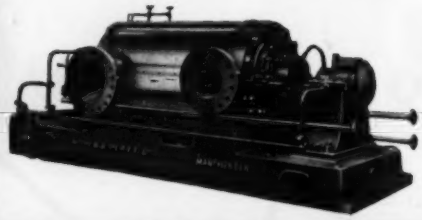
ALLIED EQUIPMENT: Bucyrus-Erie Tractor Equipment • Isaacson Landclearing and Earthmoving Equipment • Heil Earthmoving Equipment • Superior-Cardwell Sidebooms and Angle-Fillers • Hughes-Keenan Tractor Cranes • M-R-S Diesel Wheel Tractors and Mississippi Wagons • Hough Payloaders • Trojan Road Maintainers • Brookville Locomotives • Ready-Power Engine Generators.

Centrifugal Pumps & FLAMEPROOF MOTORS

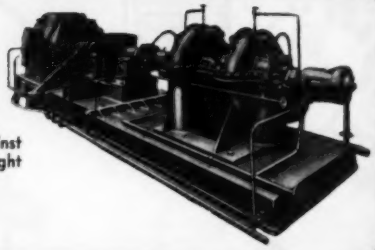
Main Pipeline Pumps....



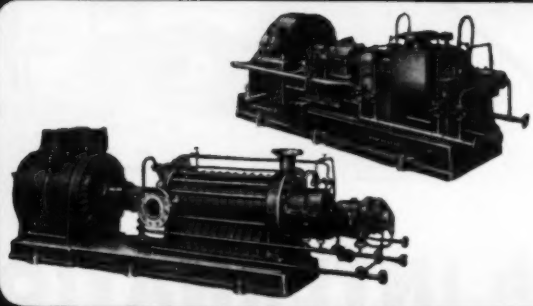
Mather & Platt multi-stage 'Plurovane' pumps were amongst the earliest centrifugal pumps installed for main line work. The pump shown on the left is a typical modern 'Plurovane' designed for a throughput of 50,000 bbls/day of crude oil against a pressure of 750 p.s.i. when running at 1500 r.p.m.

Transfer and Loading Pumps

Our standard ranges include a pump for nearly every transfer or loading duty. The two-stage "Medivane" pump illustrated on the right can handle 700 tons/hr. of crude or products against heads up to 500 ft. It is driven through a gas tight wallbox by a 550 h.p. Mather & Platt Motor.



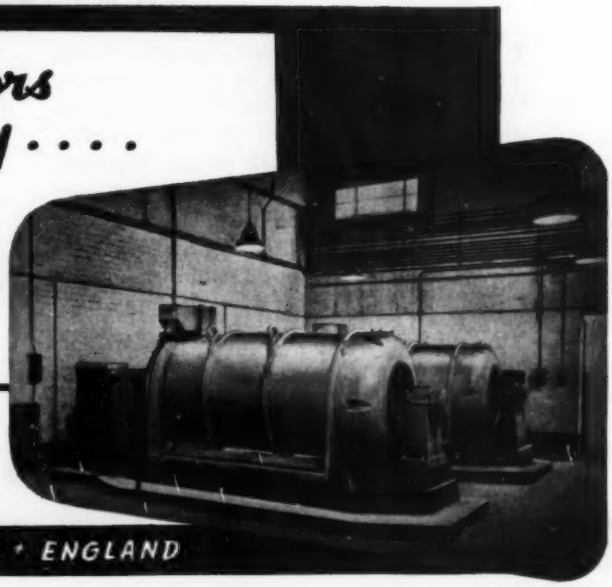
Refinery Process Pumps



Our long refinery experience at home and abroad enables us to supply pumps for the most arduous refinery duties. The illustration shows typical units:—a steam turbine driven pump handling oil at 500 degs. F. and a motor driven "Plurovane" pump dealing with light volatile hydrocarbons.

Flameproof Motors on Pipeline Duty....

Mather & Platt electrically-driven centrifugal pumps on an oil pipe line. The motors here illustrated are of the totally enclosed flameproof type, and are of 1,000 h.p. capacity, fed from a 3 phase 50 cycle 6000/6600 volt supply. They are squirrel cage direct-on started machines with a starting current of four times full load value.



MATHER & PLATT
LIMITED
PARK WORKS · MANCHESTER, 10 · ENGLAND

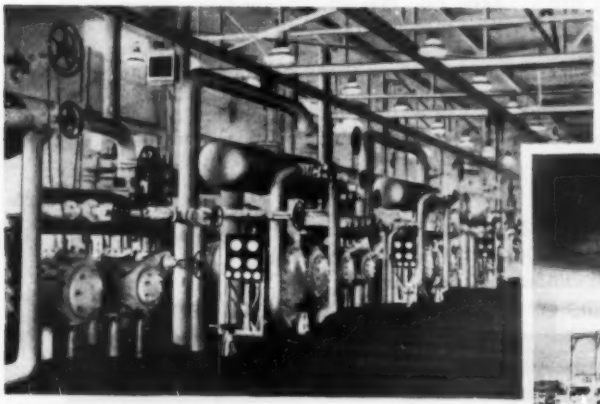
Overall View showing new facilities . . . Ethylene Plant, Ethanol Plant and Isopropanol Plant

THE GIANT *of* GRANGEMOUTH

The British Petroleum Chemicals Ltd. plant at Grangemouth, Scotland, will supply the British Isles with a diversified line of important industrial chemicals and chemical intermediates derived from a crude petroleum stock. It was designed by Stone & Webster Engineering Corporation and built under the supervision of E. B. Badger & Sons Co. (Great Britain) Ltd.

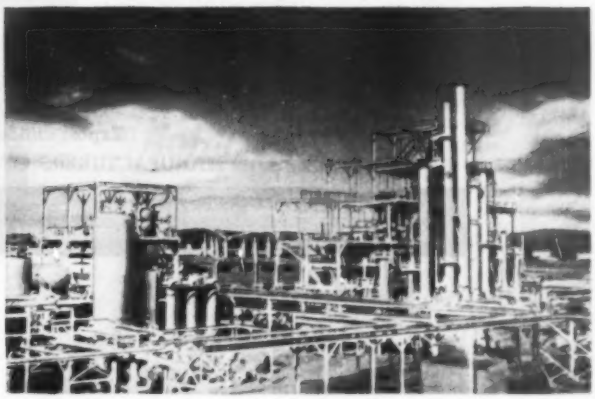
STONE & WEBSTER ENGINEERING CORPORATION

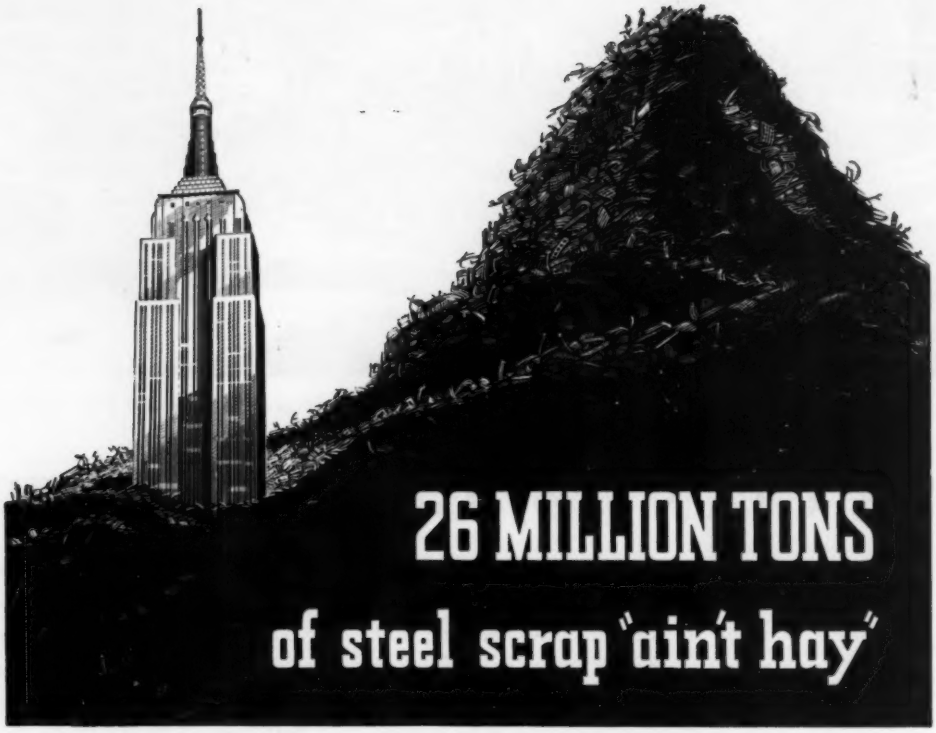
A SUBSIDIARY OF STONE & WEBSTER, INC.



Compressor House – Interior

ETHYLENE PLANT
Cracking and Fractionating Structures





26 MILLION TONS

of steel scrap "ain't hay"

IT took 57,000 tons of steel to build the Empire State Building in New York. That's about one-tenth of one percent of the tonnage of scrap required to produce the new steel demanded for America's defense and civilian needs this year.

Half of this scrap is produced by the steel mills themselves. The other half - approximately 26 million tons - must be supplied by the public. That tremendous tonnage is the equivalent of 461 Empire State Buildings - over 1400 carloads of scrap every day of the year.

Right now there is a scrap shortage. It threatens to interfere with steel production. So we appeal to you, as a user of steel and steel products, to do all you can personally to help collect scrap.

Somewhere in your place of business - and even at home - there are things that can be scrapped - worn-out or obsolete machines, pipe, boilers, tools, structural parts, etc., that you'll never use again in their present form. Turn them in through regular channels. Call the nearest dealer and start your scrap on its way to the steel mills - to help America reach its production goal of 105 million tons of new steel in 1951. It is this team-work that will help us win the victory again.

YOUR SCRAP YOUNGSTOWN IS NEEDED

The Youngstown Sheet and Tube Company

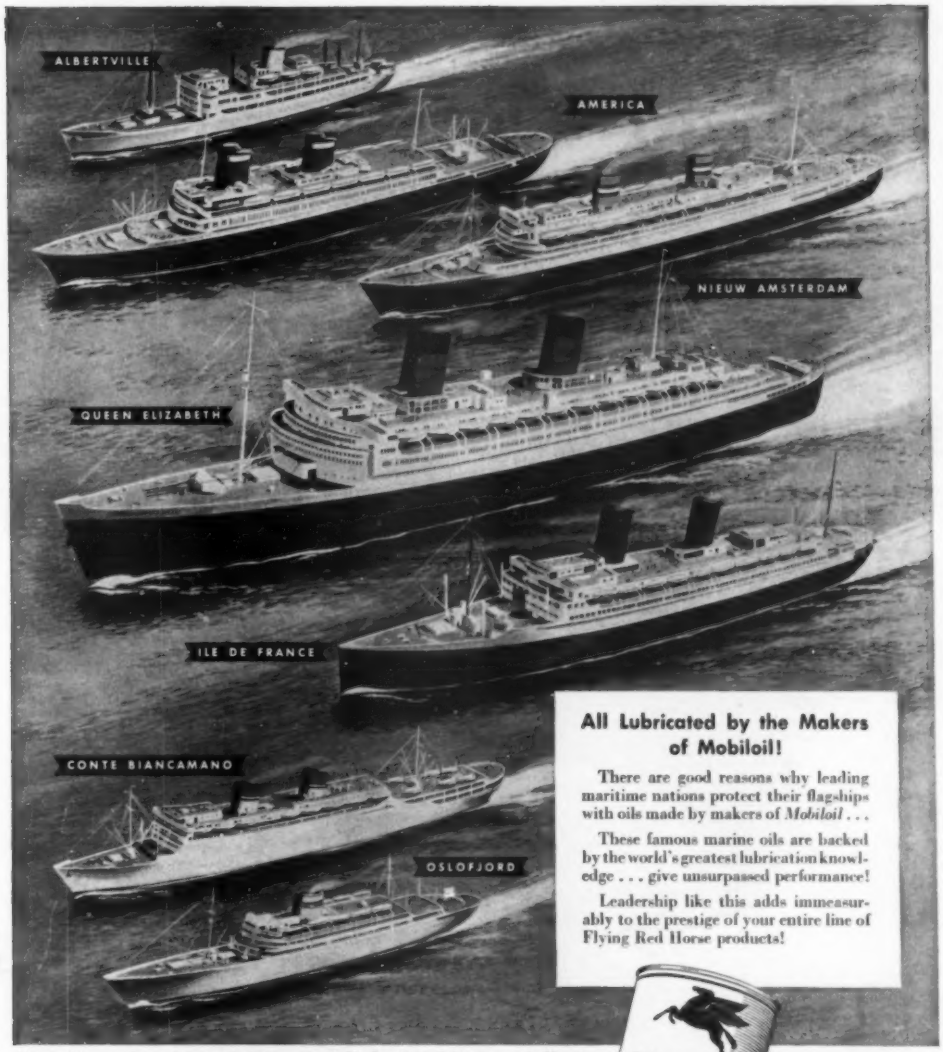
General Offices--Youngstown 1, Ohio

Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment

First With the Flagships



All Lubricated by the Makers of Mobiloil!

There are good reasons why leading maritime nations protect their flagships with oils made by makers of *Mobiloil* . . .

These famous marine oils are backed by the world's greatest lubrication knowledge . . . give unsurpassed performance!

Leadership like this adds immeasurably to the prestige of your entire line of Flying Red Horse products!

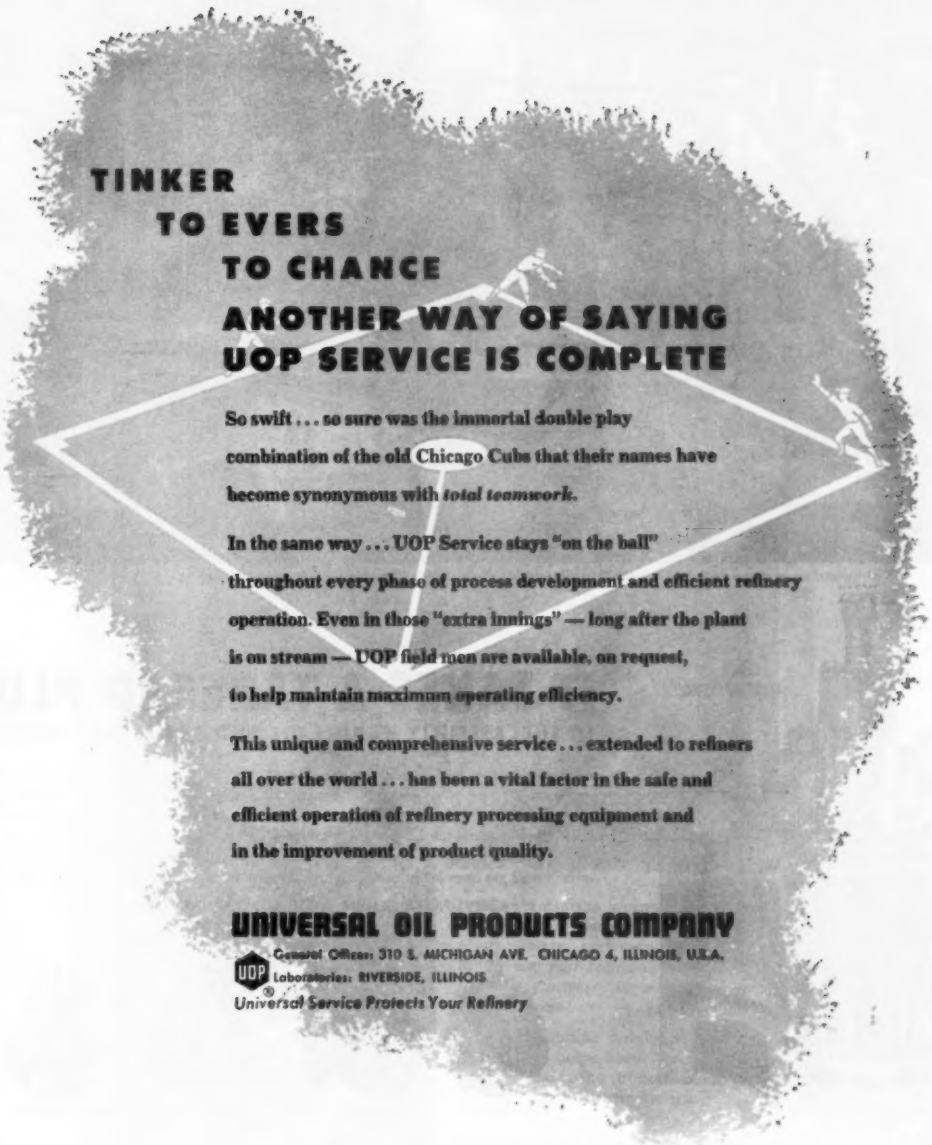
Now More than Ever—it Pays to Sell the World's Best Seller!

Mobiloil

Mobilgas

SOCONY-VACUUM OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

TINKER
TO EVERS
TO CHANCE



TINKER
TO EVERS
TO CHANCE
ANOTHER WAY OF SAYING
UOP SERVICE IS COMPLETE

So swift . . . so sure was the immortal double play combination of the old Chicago Cubs that their names have become synonymous with *total teamwork.*

In the same way . . . UOP Service stays "on the ball" throughout every phase of process development and efficient refinery operation. Even in those "extra innings" — long after the plant is on stream — UOP field men are available, on request, to help maintain maximum operating efficiency.

This unique and comprehensive service . . . extended to refiners all over the world . . . has been a vital factor in the safe and efficient operation of refinery processing equipment and in the improvement of product quality.

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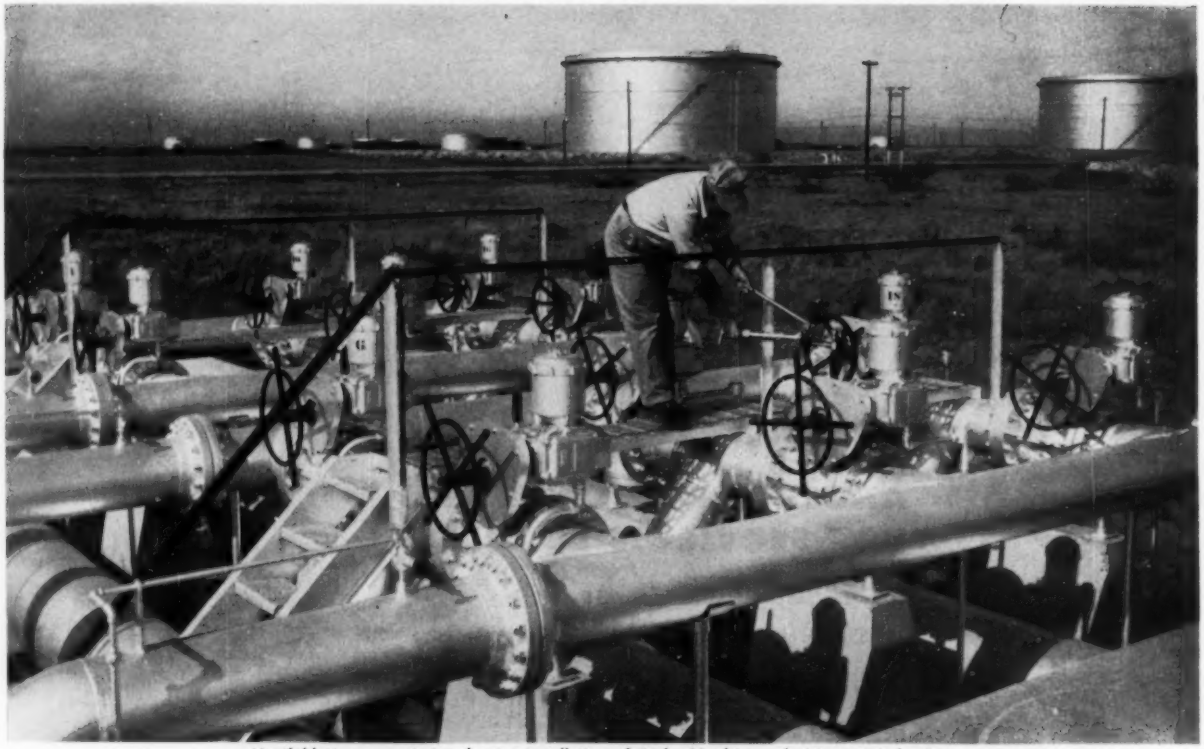
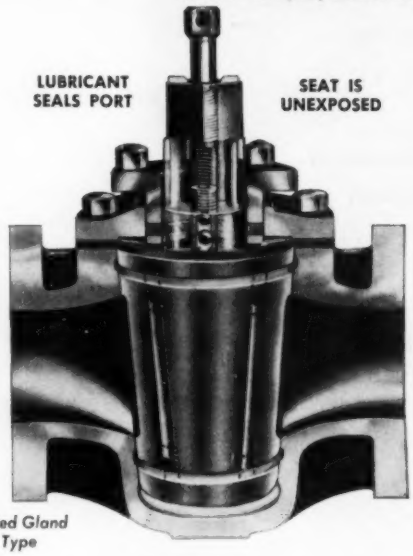
Universal Service Protects Your Refinery



Manifold at a pump station showing installation of Audco-Nordstrom electric operated valves



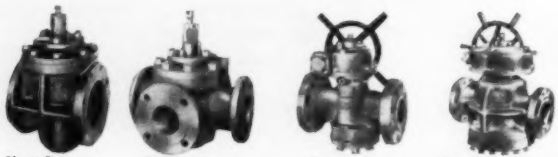
Bolted Gland Type

IT TAKES A TAPERED PLUG

TO SUCCESSFULLY HANDLE OIL AND GAS AT ANY PRESSURE

An exposed valve seat is subject to rapid wear. Dust and grit carried in the line flow can attack an exposed seat. Audco-Nordstrom valves give full protection to the seat. Being tapered, the plug is always positively seated on a film of protective lubricant. A quarter-turn fully closes or opens the valve without allowing the seat to be exposed to the line. The plug can be jacked if ever too tight by turning the lubricant screw. Specify Audco-Nordstrom valves on all gas lines for greatest economy, longest life and protection against leaks.

KEEP UPKEEP DOWN WITH AUDCO-NORDSTROM VALVES



Short Pattern | Multiport | Hypreseal | Round Opening

BRITISH

Audco-Nordstrom

AMERICAN

LUBRICATED VALVES

ROCKWELL MANUFACTURING COMPANY
400 N. Lexington Ave., Pittsburgh 8, Pa.
Export: International Division, Rockwell Manufacturing Co., 7701 Empire State Bldg., New York 1, N.Y. Canadian Licensees: Peacock Bros., Montreal, Quebec.

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Newport, Shropshire, England
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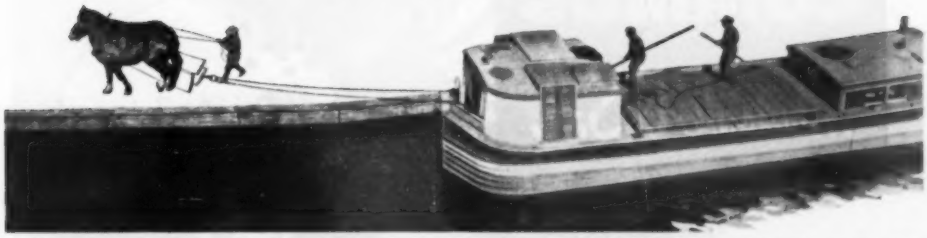
Now Petroleum Tows the line!



Towboats are mostly power plants and propellers. Petroleum provides the essential fuels and lubricants. Many of these are Texaco—which serves shipping the world over.

Petroleum Progress helps keep marine traffic moving

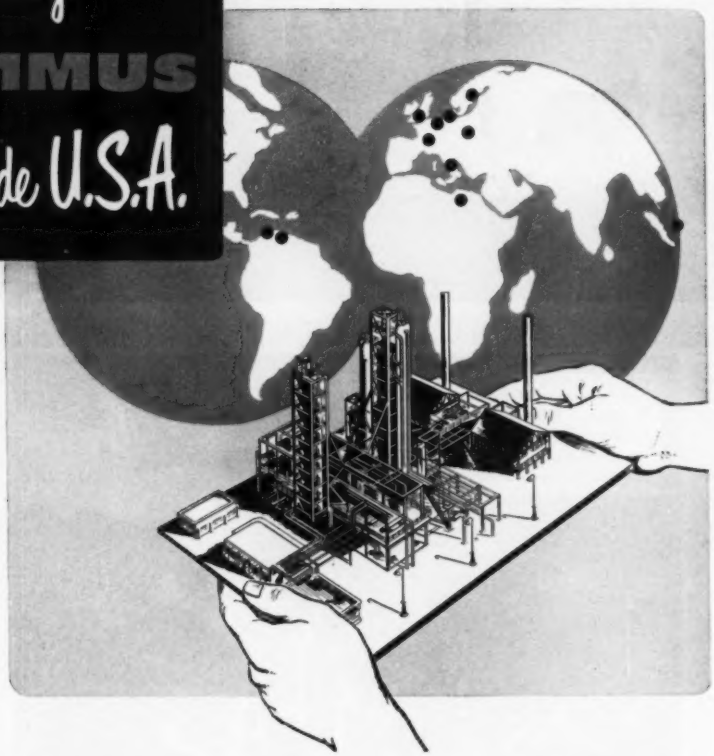
TODAY'S marine workhorses are the rugged, little tugs or towboats. These dwarfed, waterborne giants push and pull scows, barges, cargo ships and elegant ocean liners—with infinite ease and tremendous skill—through America's maze of inland waterways, in and out crowded harbors and even on the high seas.

Here is another notable example of petroleum supplying the power that helps keep America on the move—and strong. It also illustrates the progress made possible by free men at work in a land of free competition.

THE TEXAS COMPANY

Petroleum Promotes Progress

...by LUMMUS ...outside U.S.A.



Dots on the globe indicate countries where scores of post-war refinery and chemical projects carry the seal "... by Lummus".

All classes of Lummus service—process design, engineering, construction—are represented in these overseas projects. In a number of cases, combined projects constitute complete oil refineries.

Processes employed include distillation; propane deasphalting; catalytic and thermal cracking; reforming; Polyforming; coking; lube oil manufacture by solvent refining, solvent dewaxing and clay treating; and petroleum chemicals production.

Each job—whether just starting, partially completed, or on stream—bears the Lummus stamp of over-all competence and international experience.

We invite you to consult Lummus on *your* next project.

THE LUMMUS COMPANY

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WORLD PETROLEUM

The Management Publication of the International Petroleum Industry

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THIS MONTH'S COVER

Cleaning the cat. Job in progress in the cover photograph is the vacuum removal of residual fluid catalyst from the reactor at Gulf Oil Corporation's Philadelphia refinery. Cleaning of the reactor is a characteristic step in a cat cracker turnaround prior to metal inspection. Photograph courtesy The M. W. Kellogg Co. designers and builders of Gulf's unit. Gulf now is planning to enlarge the Philadelphia plant by about 125,000 b/d to make it one of the largest units on the East Coast.

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DUNCAN, OKLAHOMA

Editorial

Oil Industry Demonstrates Its Adaptability

A STRIKING illustration of the oil industry's ability to meet unexpected demands and sudden emergencies has been afforded by the disappearance from international trade, temporarily it is hoped, of Iranian oil. The sudden withdrawal of more than 600,000 barrels of daily production at a time when the world's use of oil is rising at the rate of 430,000 barrels daily presented a difficult problem.

The most serious aspect of the Iranian shutdown was the closing of the Abadan refinery, largest in the world, with a daily out-turn of over 450,000 barrels of products. Cessation of its output could not fail to create disturbance in many markets, especially those of the Near and Far East which were dependent to a large extent upon supplies from this source. Predictions were made that rationing of gasoline and other products might become necessary in many places. Since Europe likewise had come to depend to a considerable extent on Iranian oil to supply its rapidly growing requirements, there was apprehension that its loss might seriously interfere with economic recovery and upset the program of rearmament to which the countries of Western Europe were committed. Therefore it became a matter of direct concern to all participants in the movement to provide an effective defense against possible aggression to see that this particular area should continue to be provided with its essential requirements of petroleum.

The industry moved quickly to meet the situation. In the United States, with the necessary approval of the federal government for the pooling of resources and facilities, a committee was set up to determine what could be done by American companies to aid in filling the gap that had been suddenly created. Overseas a similar organization was formed to act for European companies. By September first upwards of 39 million barrels had been allotted for shipment during the remainder of the year from various sources to supply markets formerly served by Iranian oil, and shipments of 370,000 barrels daily had been booked for the ensuing month in addition to increases from British controlled sources. American companies operating in the Middle East and South America diverted shipments intended for the United States to supply the immediate needs of Europe. In view of the probability of larger exports from the United States being required for an indefinite time, the Petroleum Administration for Defense urged an increase in production above the high level previously established. United States refiners are endeavoring to replace the diverted imports by increased purchases of Gulf Coast crude, a matter of some difficulty in view of the tight supply situation.

As a result of the action taken there has been no serious interruption in the movement of oil and oil products to the areas where they were most needed. Markets in the Middle and Far East have suffered to some extent and it became necessary temporarily to reduce air service from Europe to the Orient because aviation fuel was in short supply at refuelling stations. For the main part, however, the oil trade, shifting to new routes in some cases, has been able to carry on with no substantial interruption as a result of being able to call into play the resources of the industry in widely separated locations.

While Iran's defection from the ranks of petroleum suppliers has been a loss to world economy that is not to be minimized, the most serious of its possible effects have been counteracted for the time being by prompt action on the part of the international oil industry to which all of its larger segments have contributed. Production in both hemispheres has been stepped up, available capacity in European and American refineries has been brought into play, shipments from the Middle East and South America have been rerouted from the United States and Canada to Europe; the American industry, already working at top speed, has drawn upon its accumulated stocks while working to raise production and refinery runs to fill the gap of lessened imports.

This is only the latest of many demonstrations that the oil industry has given of its ability to adjust itself to changing conditions and to meet unanticipated emergencies. This faculty was impressively shown at the commencement of World War II when new refining techniques made possible a great expansion in the provision of high test aviation fuel to meet the requirements of that conflict, and when the loss of natural rubber supply was nullified by petroleum's contribution of an efficient synthetic substitute. It is being revealed again in other new processes to increase the supply of special products needed for rising defense requirements.

The oil industry's capacity to meet new and unforeseen demands stems largely from its devotion to research to which hundreds of millions of dollars and the energies of tens of thousands of highly skilled workers are constantly devoted. The industry is continuously striving to anticipate future needs, to introduce new processes and to discover more efficient methods of conducting its operations from the search for its primary material to its ultimate use. By this consistent policy it has vastly broadened its field of usefulness and has made petroleum a fundamental factor in all industrial progress. In so doing it has contributed immeasurably to the increase of human productiveness and to the improvement of the conditions under which men live and work in all parts of the world.

Venezuela is Host to World "Petroleros"

Santiago E. Vera, Minister of Mines and Hydrocarbons, delivering the opening address. All photographs are by George Bart, Jr., for WORLD PETROLEUM.

Doctor Alejandro Pietri, General Counsel for Creole; Señor Sosa Gonzalez, Caracas businessman; Doctor Jose Martorano Battisti, Petroleum Counselor for the Venezuelan Embassy in Washington; Basiliso Gil Lazaro, General Representative of the Compañia Española de Petroleos; and Doctor Jose Maria Travieso, counsel for Socony-Vacuum, Venezuelan Atlantic, and other operators.

G. S. McCurdy, Operations Manager, Mene Grande; Chester M. Crebbs, formerly President of Mene Grande and now a Gulf consultant; K. C. Heald, Vice-President and Director of Gulf; Walter L. Keefe, Manager of Meneg's Eastern Division; and I. G. Davis, Vice-President and Director of Mene Grande.

A. P. Claudet, Vice-President and General Manager of Schlumberger Surenco; Mrs. Norman Yett; Jean de Coudier, French government tanker expert; R. B. Sleigh-tholm and Bert Villegas of the Oficina Tecnica Stubbins, at the cocktail buffet in the Hotel Avila.

THE first National Petroleum Convention of Venezuela got under way in Caracas at noon on Sunday, September 9, as Minister of Mines and Hydrocarbons Santiago E. Vera extended his country's greetings to oil men of some 20 nations. The start of the proceedings was held up for about an hour for the arrival of the U. S. delegation, headed by Secretary of the Interior Oscar B. Chapman, whose plane was delayed at Curacao. Chapman's party, including Bruce K. Brown, deputy Petroleum Administrator for Defense, and C. Stribling Snodgrass, assistant deputy in charge of foreign operations, was met at the airport by Norman Armour, American Ambassador to Venezuela.

The inaugural session of the week-long congress was simple, dignified and brief. Surrounded by Ministry and oil company officials at a round table in the auditorium of the Andres Bello high school, Minister Vera was introduced, spoke for about five minutes, and declared the convention open. The session was then adjourned and champagne was served to the 500 present in the patios of the school.

The business of the convention was to be treated in eight morning and afternoon sessions of two or three hours each during the ensuing week. Seven papers prepared by the operating companies, and one prepared by the Ministry, were to be presented. The history and present status of the most important aspects of the industry in Venezuela are covered in these papers, which have also been compiled in a 453-page book in both English and Spanish for presentation to the oil men attending the conference. A list of the papers, with their authors, follows:

Monday: "Geological Resume," prepared by Socony-Vacuum Oil Co. of Venezuela.

Authors: Eli Mencher, Socony; H. J. Fichter and H. R. Renz, Shell Caribbean Oil Co.; W. E. Wallis, Creole Petroleum Corp.; J. M. Patterson, Texas Petroleum Co.; R. H. Robie,

Minister Santiago E. Vera (Mines and Hydrocarbons) and the other officials of the convention opening the first National Petroleum Convention of Venezuela. Left to right, Doctor Eduardo Acosta, Secretary (Ministry); Doctor Luis Herrera F., Vice-President (Mene Grande); Federico Baptista, Vice-President (Creole); Doctor Gustavo Thery Fombona, Vice-President (Ministry); Doctor Vera; Doctor Edmundo Luongo Cabello, Vice-President (Ministry); E. E. Branch, Vice-President (Shell Caribbean); Doctor Carlos A. Velutini, Vice-President (Socony-Vacuum); and Doctor Domingo Noriega Salazar, Sub-Secretary (Ministry). In the back row on the platform, Secretary of the Interior Chapman was seated with Acting Minister Luis Eduardo Chataing (Public Works); Minister of Finance Aurelio Arreaza; and Commandante Guillermo Pacanins A., Governor of the Federal District; as guests of honor.

Venezuelan Atlantic Refining Co.; and H. H. Renz, Mene Grande Oil Co.

"Exploration," prepared by Sinclair Oil & Refining Co.

Authors: Bernard N. Moore, Sinclair; L. W. Henry, Richmond Exploration Co.; D. B. Williams, Shell Caribbean; D. C. Porterfield, Creole; T. A. Kibby, Mene Grande; N. P. Teague, Robert H. Ray Co.; R. H. Mansfield, Sinclair; and J. E. Dorris, Seismograph Service Corp.

Tuesday: "Development of the Oil Fields," prepared by the Texas Petroleum Co.

Authors: Kenneth S. Fricke, Texas; Robert W. Beck, Creole; L. L. MacWilliams and K. T. Miller, Socony; Joseph H. Deming, Atlantic; and R. E. Russell, Industry's Consulting Organization.

"Production," prepared by Creole.

Authors: Dr. Carlos Rojas Davila, Creole; A. N. Lucie-Smith, Shell Caribbean; and Hoyt Austin, Mene Grande.

Thursday: "Transportation," prepared by Mene Grande personnel.

"Refining," prepared by Shell Caribbean.

Authors: W. F. Mackie, Shell Caribbean; John Field, Creole; R. M. Baskin, Venezuela Gulf Refining Co.; and J. R. Martinez Ponte, Sinclair.

Friday: "Taxation," prepared by the Technical Office of Hydrocarbons, Ministry of Mines and Hydrocarbons.

Authors: Dr. Gustavo Thery Fombona, director of the technical Office of Hydrocarbons, and Dr. Edmundo Luongo Cabello, chief of the Technical Department of Economy.

The sessions were to be broken in midweek by visits to the National Pantheon, the Military School and University City. At the week's end, representatives of foreign countries and of the press were to take a three-day tour by plane to inspect the phenomenal oil fields of the Maracaibo basin and the mammoth refineries which Shell and Creole have erected in that part of the country in recent years.

Social aspects of the occasion were amply recognized. On the first day, the Ministry gave a cocktail buffet to 1,100 people at the Hotel Avila, one of the finest in Latin America, where many of the conference attendants were registered. The oil companies were to reciprocate with an affair for the same number at the Valle Arriba Golf Club on Thursday. At the close of the convention, Foreign Minister Gomez Ruiz and his wife were to give another evening party at the Casa Amarilla. Invitations to the convention and the related gatherings were delivered simultaneously in an envelope containing also a lapel button and a carnet of identification.

Attendants at this first oil convention in Venezuela were of two categories, delegates and observers. The delegates consisted of 40 officials and technicians from the Ministry of Mines and Hydrocarbons and about a hundred from the operating companies. They had the privilege of speaking in the question-and-answer period following the presentation of each paper, and of voting on any motions offered, while observers in general could neither speak nor vote. (An exception to this rule was Secretary Chapman, who addressed the first ordinary session on Monday. His speech was broadcast throughout Venezuela on a nationwide hook-up.) The proceedings were conducted in Spanish or the native language of the individual speaker.

The idea of the convention was first put forward over a year ago by Dr. Manuel Egana, then Minister of Fomento. Intervening events, such as the recent threats to the flow of oil from the Middle East and the reconstruction of refining capacity in Europe, have turned the spotlight on Venezuela as a prime source of supply for the Western Hemisphere to an unprecedented degree.

The countries invited to send observers to the conference, most of which were represented as the sessions opened, were England, the Netherlands, Mexico, Cuba, Sweden, Spain, Italy, Ecuador, Chile, France, Panama, Bolivia, Peru, Belgium, Brazil, Lebanon, Colombia, Egypt, Saudi Arabia and Iran. Iran's delegate was Prince Farman-Farmaian, director general of the Department of Petroleum and Mines, who came to Caracas accompanied by his sisters, the Princesses Leili and Haidah.

Special invitations were issued to a group of about 100 distinguished figures of the petroleum world who are not immediately connected with the Ministry or located in Caracas with the operating companies. One of the first to be invited was Prof. W. H. Carson, dean of the Engineering School at the University of Oklahoma, under whom Doctor Vera took a degree in petroleum engineering. (There are at present about 70 Venezuelans studying at Oklahoma, many of them on scholarships awarded by the Government or the companies in Venezuela.) Minister Vera, who is 38 years old, also has an engineering degree from the Central University of Venezuela. He worked for Creole Petroleum Corp. from 1939 to 1944. He was then successively dean of the engineering faculty at the local university, and then its rector. In 1949, he was counselor to the Venezuelan Embassy in Washington. He was minister to Switzerland when early this year the then Ministry of Fomento of which the Office of Hydrocarbons was a sub-agency, was reorganized and petroleum and mining affairs were handed over to a ministry created for the purpose.

"As the second producer and the first exporter of oil in the world," Minister Vera declared, "Venezuela offers a propitious field for the historical, technical and social examination of an industry which occupies rank of the first order in the world's economy, as much for its contribution to the welfare of humanity as to the preservation of peace." Harking back to the earliest days of commercial petroleum development in Venezuela, he spoke of a company formed in 1882 with a capital of $30,000

E. E. Branch, of the Shell management in Caracas, with J. A. Beckett, Petroleum Attache, English Embassy, Washington, and Leonard A. Astley-Bell, Vice-President of Shell in New York.

Federico Baptista, Chief PE, with Siro Vasquez, head of Production Department, and Captain Kyle, head of Marine Operations, all of Creole, before the inaugural session.

R. S. McCurdy, General Manager of Shell Caribbean, and E. L. Steiniger, President of Sinclair Oil & Refining.

Frank M. Porter, President of the American Petroleum Institute (right) chats with R. C. Jones, General Manager of API.

Ambassador N. Armour, left, with Secretary of the Interior Oscar B. Chapman. Bruce K. Brown, deputy head of PAD, and C. Stribling Snodgrass, deputy for foreign operations, standing.

and a concession of 100 hectares to exploit seeps in the mountain state of Tachira. The pioneers in this enterprise were General Jose Antonio Baldo, Ramon Maria Maldonado, Manuel Antonio Rincones and Pedro Rafael Rincones. Their company drilled three wells, 53, 24 and 83 meters deep. With a rudimentary still, they refined the oil extracted from the two producers, and produced kerosine which was sold to householders in the neighborhood.

Further in his discourse, the Minister reaffirmed "the two fundamental ideas which govern the Venezuelan petroleum policy: security and legal treatment for the investors on one hand, careful protection of the interests of the nation on the other." In the same vein, speaking of the pride Venezuela feels in its past contributions and of the present expansion of the oil industry there, he mentioned the "assurance private capital has of a profit that represents an inducement to investment," which also "contributes in the highest possible degree to better the conditions of life in this country and to accelerate the rhythm of its progress." Referring to the frequent charge that the Venezuelan economy is too much dependent on the one prime commodity, he spoke of the necessity of using oil wealth to reinforce the overall economy of the country by diversifying the sources of production.

As head of the United States official delegation to the convention, Secretary of the Interior Oscar L. Chapman presented the greetings of President Harry S. Truman. In his address, Secretary Chapman stressed the importance of the oil industry of Venezuela in times of international stress as well as in times of peace. He paid particular tribute to the Venezuelan contribution to the success of World War II. "Oil production here was stepped up 50 percent during the war years," he said, "and this increase may well have represented the margin of victory that was ours... If one judges the contribution on a relative basis, Venezuela's record was second to none."

Secretary Chapman showed that Venezuela again today is making important contributions to the defense of the free world by increasing output to more than 1,700,000 barrels daily. He said that oil used in support of United Nations operations in Korea totaled 50 million barrels in the first 12 months of fighting. He cited the growth in consumption per unit from 440 gallons of avgas per hour in the B-29 to 960 gph for the B-36; from 63 gph for the P-51 to 355 gph for the F-48.

In time of peace "it is largely through increased use of energy resources that the world progresses toward its goal of higher standards of living for all," he said. "In recent years it has been petroleum that has contributed by far the largest part of the world-wide increase in the use of energy.

"In Venezuela, as in the United States, the petroleum industry and the national economy have grown and prospered together because this cooperation and understanding have constituted a guiding principle of action. We must all be zealous to see to it that the principle is maintained and vigorously applied.

"National strength depends on wise and efficient use of natural resources. Today the survival of the free world hangs in the balance. Today we must be strong if we would remain free. Today we can count ourselves fortunate that your country and mine have followed the policy of cooperation between government and industry and that our great petroleum resources can be put to work to safeguard our freedom," Secretary Chapman concluded.

Chief among the forty-man delegation presided over by Doctor Vera were the following experts, mainly from his own Ministry: Dr. Gustavo Thery Fombona, director of the Technical Office of Hydrocarbons; Dr. Manuel Reina, director of Political Economy (Ministry of Foreign Relations); Dr. Edmundo Luongo Cabello, director of Economy; Dr. Francisco Medina Olivieri, chief of the Technical Department of Production and Fiscalization; Dr. Luis J. Cordero, chief of the Technical Department of Conservation; Dr. Carlos Paradisi, director of Mines; Dr. Armando Schwarck, director of Geology; and Dr. Jose Lorenzo Prado, director of Chemical Investigations.

Doctors Medina and Cordero, with J. A. Giacopini Zarraga, formed the commission which reviewed the credentials of active delegates at a preparatory session presided over by Dr. Thery Fombona. Vice presidents assisting the Minister in the conduct of the conference were: Doctors Thery Fombona and Luongo Cabello of the Ministry; Federico Baptista, chief petroleum engineer of Creole; E. E. Branch of the Shell Caribbean management; Doctor Luis Herrera F., assistant to the president of Mene Grande; and Doctor Carlos A. Velutini, chief of the land department of Socony-Vacuum.

Besides Doctor Carson, the specially invited observers included Doctor Gustav Egloff, Universal Oil Products Co.; Doctor Jose Martorano Battisti, Petroleum Counselor to the Venezuelan Embassy in Washington; Dean W. L. Nelson of the refining department of the University of Tulsa; E. L. Steiniger, president of Sinclair Oil & Refining; G. A. Tuyl Schuitemaker, president of the Organizing Committee of the Third World Petroleum Con-

gress, The Hague; W. M. Keck, Jr., president of the Superior Oil Co.; Frank Storms, Bethlehem Steel Export Corp.; B. S. Watson, vice president of Cities Service; August C. Long, vice president of The Texas Co.; Roger Van den Perre, Compania Francesa de Petroleos; W. P. Woodring, U. S. Geological Survey; N. J. Cantwell, Cardwell Manufacturing Co.; Charles P. Williams, Williams Brothers of Venezuela; Robert Siegel and Rear Admiral Thomas J. Kelly, Socony-Vacuum; Henry B. Wilson, Jr., International Petroleum; G. W. Walton, Ideco; Doctor Mahmood Abozeid Bey, director of mines for Egypt; Frank M. Porter, president of the American Petroleum Institute; O. C. Wheeler, for the AAPG and International Petroleum; Fred J. Funk, manager of the foreign division, Ohio Oil Co.; M. E. Montrose, vice president of Hughes Tool Co.; Robert E. Ellis, Jr., Frederick Snare Corp.; Robert L. Boggs, chief of western hemisphere activities, Gulf Oil Corp.; K. C. Heald, vice president of Gulf; John F. Mason, of Atlantic Refining; W. A. Lambert, Reed Roller Bit; E. W. Clark, coordinator of production, Shell, New York; Leonard A. Astley-Bell, vice president of Shell, London; Col. Moody E. Layfield, petroleum office, Caribbean Command; G. H. Westby, president of Seismograph Service Corp. of Deleware; Chester M. Crebbs, formerly general manager of Mene Grande and now a Gulf consultant; Christian F. Dohm, vice president of Conorado; A. C. Gronbeck, vice president for foreign operations, The Lummus Co.; Charles E. Simmons, Mid-Continent Oil & Gas Association; and scores of other representatives of the industry in all its phases.

Besides the representatives of the local press, the conference received world-wide news coverage from M. P. deVeulle, director of *Petroleum Press Service*, London; Jorge Bravo, *United Press;* Morris Rosenberg, *Associated Press;* Simon Santamaria, *Reuters;* Doctor Oscar B. Irizarry, *Petroleo Interamericano;* and Neal R. Van Middlesworth for WORLD PETROLEUM.

In addition to the officially sponsored trip to the oil fields of the Maracaibo basin, where the oil industry in Venezuela got its start in 1917, delegates and observers had other opportunities to get first hand acquaintance with the fields. Mene Grande Oil Co. put one of its planes at the disposal of a group of the visitors to make a two-day tour of Eastern Venezuela, where Mene Grande is the principal operator. Points inspected were the Quiriquire field and camp of Creole, the oil fields of the Greater Oficina and San Tome camps of Mene Grande, and the newly important iron mines south of the Orinoco River. Guests on this trip were: C. Stribling Snodgrass, PAD Deputy for foreign operation, and Butler Brown, of the Department of the Interior; Jose Martorano Battisti, of the Venezuelan Embassy in Washington; R. L. Boggs, of Gulf; I. G. Davis, of Mene Grande; Raymond Leddy, Oil Attache of the American Embassy in Caracas; H. W. Haight, executive vice president of Creole; Siro Vasquez, head of Creole's production department, Frank M. Porter, president of the API; W. I. Woodson, Texas Co.; and W. Alton Jones, president of Cities Service Co. I. G. (Grady) Davis, vice president and director of Mene Grande Oil Co., was host to the group.

Storage tanks for refined products at the Puerto la Cruz bulk plant of Creole Petroleum Corp.

Discoveries Exceed Production

WITH an accelerated drilling program adding new oil reserves faster than crude is produced coupled to an expanding refining industry, the Republic of Venezuela faces a future of undoubted prosperity. Aside from petroleum, the nation also is entering an era of iron ore mining which will contribute greatly to the future of the country.

National revenues are growing with industrial expansion and the federal authorities have adopted ambitious projects for national development. The federal budget for the 1951-52 fiscal year has been increased 19.54 percent, or more than $100 million, to $585 million (about $175 per capita). No deficit spending is involved. In the past fiscal year there was a surplus of $143 million. In the coming year $156 million will be spent for public works, $43 million for education, $42 million for health and social welfare and $34 million for the development of agriculture. These are tremendous sums on a per capita basis. The 1950 census revealed a national population of 4,986,000 persons.

Up to this point the petroleum industry has been the major contributor to the rapid development of the national welfare. In the past six years the oil industry has increased its investment in the country by $1,232 million, bringing the total at mid-1951 to $1,700 million. In the same period the industry has paid another $1,200 million into the federal treasury, a sum somewhat larger than net profits.

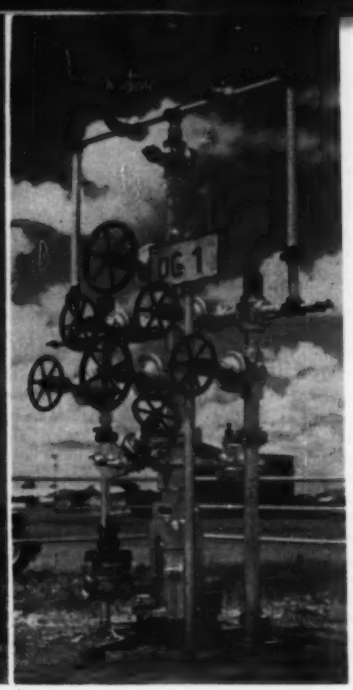
At the present time one person out of each 100 inhabitants in Venezuela is employed in the oil industry. About 93 percent of all oil workers in the country are Venezuelans and seven percent are foreigners. Average earnings per worker, including special benefits such as retirement pay, average about $4,500 per year. Oil companies have sought to build a staff of Venezuelan technicians as well as field and plant men and this has been accomplished to a large degree.

At the end of 1950 it is estimated that known reserves of petroleum in Venezuela approximated 9,500 million barrels. This was an increase of about 500 million barrels in the previous year during which the industry produced about 500 million barrels. Oil discovered to date in Venezuela is about 15,000 million barrels and there are very large regions, particularly in the Apure basin and lower horizons, which are largely unexplored. Two of the three major sedimentary basins now are supplying all current production.

Daily average production of Venezuela for the year 1950 was 1,498,012 barrels. Some

The gradients on the joint Shell-Creole products "Steep Inch" pipe line reach 45 percent in places like this. The line carries refined products up ten precipitous miles from Catia de la Mar to Caracas, at the rate of 1,000 barrels per hour for diesel oil, 1,500 for gasoline.

Aerial view of Guanoco-2, second of a series of holes to test a large block held by Creole in the vicinity of the Guanoco asphalt lake. The ground here in the valley of the San Juan river of Eastern Venezuela is dangerous to pass over without using plenty of fill.



Mene Grande's discovery well in Eastern Venezuela, OG-1, now the hub of some forty fields operated by six companies. From 1937, when it was completed for 1,300 b/d, to last July 31, this well had produced 978,656 barrels and it is still good for 665 b/d.

idea of the current expansion of the industry may be gleaned by comparing that figure with those in the following table of daily averages for the first six months of 1951:

January	1,634,400
February	1,635,901
March	1,678,220
April	1,689,368
May	1,698,360
June	1,699,426

The overall average for the first six months was 1,672,639 barrels per day, an increase of almost 12 percent over the average for the year 1950, and on several occasions this year the figure has passed 1,700,000. The all-time high was reached in the week ending August 6 at 1,726,727 barrels per day.

How the larger of the individual companies have been faring is shown by the table below, which gives daily average production by operators. These figures do not take into account joint-interest operations or the interest of non-operators, and therefore do not represent what is sometimes called "net share oil," or the quantities available to each company for marketing.

Company	Average 1950	Average 1st 6 mo. 1951	Percent Gain
Creole	644,751	710,966	12
Shell Co.'s	461,711	514,204	11
Mene Grande	243,300	290,661	19
Texas-Mercedes	44,416	47,167	7
Socony	36,907	46,491	28

Concern has been expressed in some quarters that the current figure of around 1,700,000 barrels is close to the maximum efficient producing capacity of Venezuela's reservoirs, and that additional production will have to come out of new discoveries. The operators seem to share this view. As the following table shows, not only has the number of rigs on new drilling increased by 22 percent since the first of the year, but the ratio of exploratory to development rigs increased from 1.4 in January to over 1.3 in June. (The drop registered in July is ascribable to the hampering effects of the rainy season on operations in areas away from established roads, and the advent of the fall and winter dry season is sure to bring still further increases in the number of wildcats.)

RIGS OPERATING
(excluding workovers)

	Development	Exploration	Total
January	62	16	78
February	64	18	82
March	68	19	87
April	65	22	87
May	69	21	90
June	71	24	95
July	76	20	96

From January 1 to about the middle of the year, Mene Grande had successfully completed nine new-field or new-pool wildcats in the highly complex Eastern Venezuela area—Cerro Pelado-1A, East Soto-1, Chaparro-1, East Caico-1, GXG-301, GXG-401, CaM-301, and FXM-101. There are indications that this company will soon step up the number of rigs running on this type of drilling. Texas Co. made a successful new-field strike with Mata-2, near Meneg's Oficina field. Atlantic has made a number of finds this year—Monal, Cocomon, and the Lechoso gas field—but the only one being followed up by active development is a new area of the Saban field which was discovered by structure drilling. Wildcatting aimed at the prolific production of the Cretaceous limestone in Western Venezuela continues, but there has been no successful hit of this kind so far in 1951.

There has been considerable pressure-maintenance building in Venezuela in recent years, largely concentrated in the relatively new and high-pressure fields of eastern Venezuela. The activity is less an indication that fields are reaching secondary recovery stages than that the companies consider it more efficient and profitable in the long run to keep pressures up during the primary production stages. The location and capacity of existing plants is shown in the following tabulation:

	Cu mts/day
Creole	
Cumarebo	75,000
Jusepin	250,000
Mulata	420,000
Quiriquire	95,000
Mene Grande	
West Guara	580,000
Oficina	547,000
Santa Barbara	51,000
Phillips	
San Roque	700,000
Atlantic	
Tucupido	140,000
Texas-Mercedes	
Mercedes	96,000

Creole is increasing the capacity of its Jusepin plant to 400,000 cubic meters a day while Mene Grande will add a combined 250,000 cubic meters of capacity to its Oficina and East Nipa plants.

Refining capacity of 320,000 barrels per day, most of it created in the last two years, will be further increased next year when Phillips completes a refinery and wax plant (two million pounds yearly) at San Roque and Shell doubles its Punta Cardon capacity from 50,000 to 100,000 barrels. A 200-mile, 30-million-cubic-foot gas pipe line, first of its kind in Venezuela, will soon be bringing fuel to industrial and later domestic users in the cities from the fields of Venezuelan Atlantic and Texas-Mercedes in Guarico. Shell, Texas and Mene Grande are currently completing a 235,000-barrel pipe line to transport crude oil 150 miles from the east side of Lake Maracaibo to the Paraguana Peninsula, one of the two refining hubs of the country. All in all, the operators themselves seem to be in little doubt about the future of the Venezuelan oil industry.

Steel Supply Remains Key To Oil Industry's Needs

By Joseph B. Huttlinger

WASHINGTON

THE fight for steel which the petroleum and gas industry needs to meet the heavier demands made upon it in production, transportation and refining continues as an uphill battle. The request of the PAD for 9.8 million tons of steel for oil industry operations, as a "minimum," is meeting a critical reception at the Defense Production Administration, which actually parcels out the steel. The budget contains a figure of 862,000 tons for use of American companies outside the United States, which is about 35 percent above the actual steel usage in the current year. For domestic operations, the request, if granted, would allow a six percent expansion of operating levels of the industry, including a 350,000-barrel daily expansion of refining capacity.

Urgency of the situation is emphasized by the difficulty which oil companies are meeting in their efforts to find crude at Gulf Coast points to replace shipments of Middle East and Caribbean oil diverted from the United States to Europe to cover the shortage of former Iranian supplies to that area. Their reports show that the crude situation has become so tight that their purchases have been reduced to a point far below the loss from outside sources. While there is stated to be some production in West Texas that might help substantially to fill the gap there is no present way, in the absence of pipe lines, of getting it to shipping ports except by resort to uneconomical tank car transportation, and with the prevailing heavy demand for tank cars it is questionable whether these could be obtained in sufficient numbers to be of much assistance.

In a statement given out here, Lt. Gen. E. O. Thompson of the Texas Railroad Commission warned that the reserve producing capacity of the United States is down to 400,000 barrels daily and that an intensified drilling campaign is needed to add the million barrels per day needed as a margin of safety. It is pointed out by oil men that while the first urgent demands resulting from the Iranian shut-down have been met by withdrawals from stocks of products, this drain cannot be withstood if the stalemate in Iran continues beyond the turn of the year, as seems likely. Whether it is a question of more wells, more pipe lines or more refining capacity, the answer in every case is steel.

The hope of some relief from the pressure upon the industry in the United States is afforded by the rising crude output in other parts of the world. According to reports received here, Kuwait production is estimated at 725,000 barrels daily for September, an 80 percent increase over the level of January. Saudi Arabia is producing at a rate of 850,000 barrels daily, up about 60 percent from 1950. In Venezuela, the increase is smaller, up from 1,600,000 barrels daily at the end of last year to 1,720,000.

There are numerous sidelights on the drive for more oil as a result of the extra pressure that is being applied.

A tariff-cutting move is part of the program to encourage oil production in other parts of the Western Hemisphere. The administration has set hearings before the Tariff Commission for October 2 and before the Committee for Reciprocity Information for October 9 on reductions in duties on crude oil and products coming to the United States. Presently, the duty is 10.5 cents a barrel on all imports up to five percent of the previous year's crude runs to stills. Petroleum imports above that level take a 21-cent a barrel tariff. Venezuelans are being encouraged to expect that reductions will be made with as much promptness as can be expected from governmental action.

Independent petroleum producers, who only a year ago were proposing a duty of $1.05 a barrel, take a dim view of efforts to reduce the duty, but a good number of oil jobbers in the United States are in favor of it. The Office of Price Stabilization wants lower duties, as do other agencies of government. The Venezuelan agreement applies to all imports of oil under "most favored" national procedure which gives to any other country the same concessions granted to the country making a reciprocal trade agreement with the United States.

The hunt for petroleum will go on in Alaska under a Navy decision to continue operations at Naval Petroleum Reserve No. 4, Point Barrow. The Navy is to ask Congress for another $5 million for the project, changing an earlier decision to wind up operations by the end of this year.

A factor that might assume great importance in the development of more production is a settlement of the tidelands issue and a program of exploration of the continental shelf, now practically at a standstill, but the prospect is that a final decision is far off. The House passed a quitclaim bill, giving title to the states, but at this writing, the chances are that the Senate will not find time to act on it. A tidelands measure favorable to the states may come from the Senate Interior Committee, and be before the Senate when it reconvenes next January. The only way the federal government could take title to the lands apparently is to declare it already has the authority to do so; this actually is under study, but the move is difficult since the government earlier said it has not the authority it needs.

Arguing from the standpoint of national defense and self-sufficiency, Secretary Chapman has proposed a $400 million coal-to-oil industry be created under sponsorship of the federal government. The aim, he says, is to insure a supply of petroleum. Actually, private industry would construct the plant, but the government would agree, in advance, to buy the output at a price that would make it profitable. While oil men in PAD and elsewhere say this would be a waste of steel under present conditions, Chapman asserts the project would require no more steel than to make the same amount of petroleum products from crude. The House Commerce Committee has looked into the matter, and will want many more facts about the synthetic industry before acting to encourage it. Another part of the Secretary's proposal is a $50 million oil-shale-to-gasoline plant.

There is no question that government officials are fully aroused to the importance of increasing oil supplies. Confidence in the nation's ability to do this over a period of years is not lacking and is supported by the optimistic report released last month by a sub-committee of the National Petroleum Council, but the road to a quick accomplishment of results is beset by obstacles of which the most important is a dearth of sufficient steel.

Receives Certificate of Achievement

Lt. Col. Hubert G. Schenck, chief of General Ridgway's Natural Resources Section, presents the Supreme Commander's Certificate of Achievement to Leo W. Stach. U. S. Army photo.

Leo W. Stach, head of the petroleum branch, Natural Resources Section, General Headquarters, Supreme Commander for the Allied powers, received a certificate of achievement from General Ridgway's Chief of Staff, Lt. Gen. Doyle O. Hickey, at the termination of nearly six years' service with Lt. Col. Hubert G. Schenck, chief of the Natural Resources Section.

In his capacity as petroleum geologist and administrative geologist during the occupation of Japan, Mr. Stach was responsible for rehabilitating the Japanese petroleum producing industry to the extent that both production and proved reserves of crude oil in Japan are now nearly double what they were at the beginning of the occupation, and average daily production is now exceeding the prewar peak. These results were achieved by mobilizing and co-ordinating the exploration potential within Japan, setting up an intensive program of exploration and introducing modern exploration and production engineering methods.

On the basis of his services as military engineering geologist during the war with the Intelligence Section of Major Gen. Hugh J. Casey's Engineer Headquarters in the Southwest Pacific theater and his geological work during the occupation of Japan, Mr. Stach, who is a graduate of the University of Melbourne, Australia, and was engaged in oil exploration in New Guinea before the war, was elected this year to membership in the Geological Society of America. Mr. Stach will remain in Japan for a few months to complete the publishing of Dr. K. Asano's Illustrated Catalogue of the Japanese Tertiary Smaller Foraminifera and the writing of a history of the petroleum industry of Japan.

Residual fuel oil supplies are short despite 100,000 b/d conversion to coal, but distillate reserves are at high level to meet quickly growing diesel fuel demand and peak furnace oil season.

Fuel Oil Faces Mixed Outlook

OIL companies in the United States have built up the largest pre-season stocks of distillate fuel oils in the history of the industry. The backlog of product is proportionately greater east of California than on the Pacific Coast, but a comfortable supply seems assured unless two adverse factors coincide: (1) an unusually severe winter, and (2) very large exports to make up for shortages in the Eastern Hemisphere.

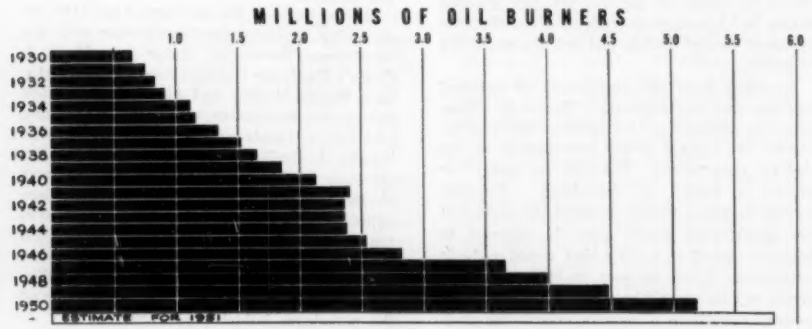
No such optimistic picture exists in the case of residual fuels. Stocks of heavy fuels are about 11 percent higher than a year ago but last year's stocks were not adequate even then. This year the higher level of industrial activity comes at a time when Abadan is shut down and when strikes have disrupted operations in the Dutch West Indies where large amounts of residual oils usually are produced from heavier grades of Venezuelan crude.

The scant supply of heavy fuels in the United States is proving to be a boon to the domestic coal industry which has been steadily losing ground to oil in recent years. As this is written, consumers of about 100,000 barrels per day of heavy fuels have converted to coal in the eastern part of the United States. Most of this conversion to coal has been at plants where cost is the primary consideration in the type of fuel used. The installations are at power plants and the like where furnaces are designed for instant conversion from oil to powdered coal and where a supply of each fuel normally is maintained. Other substantial conversions are possible which have not been made because of smoke, fly ash and other considerations outside the realm of the primary Btu cost of fuel used.

Stimulus for current conversions has been economic. Recent increases in price have wiped out the previous advantage enjoyed by the liquid fuel at seaboard points, particularly, where freight is an important element in fuel cost. Nearer to the mines in interior areas coal has been cheaper at most points continuously so that customers burning oil have done so from choice.

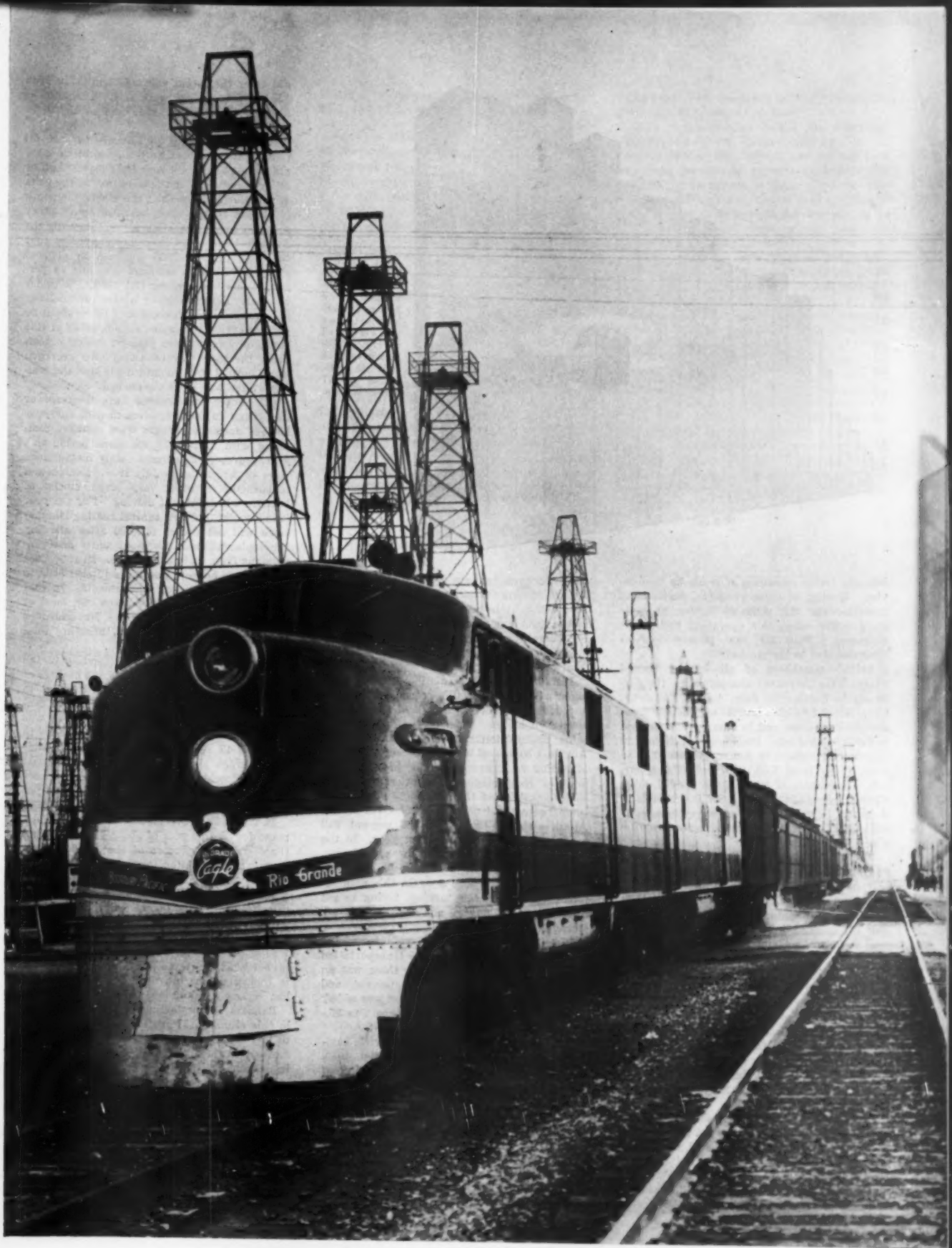
Reconversion to coal is not possible on a large scale in the United Kingdom or on the European continent as it is in the United States. Industries there have been rebuilt specifically for oil. Coal is not being mined in adequate quantities and labor is unwilling to go into the mines to produce coal if other means of livelihood are available.

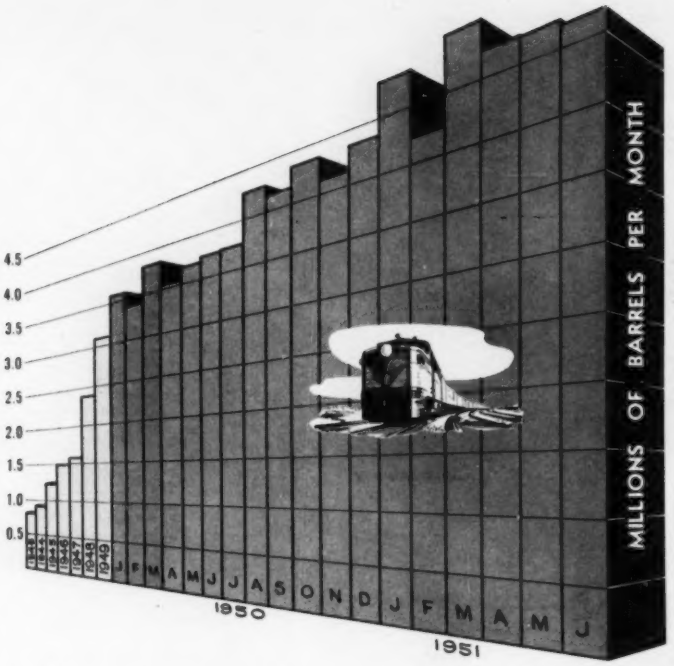
The conversion in the United States of 100,000 b/d of fuel oil to coal is about half of the global loss in supply sustained by the Abadan shutdown. Efforts to make up the remainder thus far have centered on high capacity runs at other refineries. Although crude is tight throughout the world, it is not uncomfortably so even with the loss of Iranian oil. The shut-down in Persia has been largely made up from a crude standpoint by increases in the output of Arabian and Kuwait fields. It is, of course, possible to operate thermal cracking plants as skimmers to produce largely increased supplies of fuel. During World War II some refineries were able to process aston-



◀ **Installation of domestic oil burners has been slower this year than in 1950 when 681,599 were added, bringing the total to 5.2 million. Year-end estimate for 1951 is 5.8 million.**

▶ **At mid-year there were 11,161 diesel locomotives employed by United States railroads, an increase of 50 percent in 18 months. In 1952 it is estimated that more than 14,000 will be in service—each consuming an average of 5,400 barrels of diesel fuel per year. Photo of Missouri Pacific train passing through the East Texas field courtesy *Diesel Progress* magazine.**


Rio Grande



Diesel locomotives on United States railroads consume more than 160,000 barrels of diesel fuel daily. Consumption in 1952 is estimated at 77 million barrels.

ishingly large quantities of crude by this device. Quality of some products, particularly gasoline, and the yield of lighter products must suffer when this operating method is necessary. Thus far, few, if any, refiners have resorted to the method.

British purchases of oil in the United States have increased sharply since the difficulty in Persia. In July, Asiatic Petroleum Corp. lifted 3,885,000 barrels of products from American sources and in August this jumped to 6,952,000 barrels. Distillate fuel liftings in August were about 50 percent higher than in July, rising from 1,595,000 to 2,367,000 barrels. Purchases of heavy fuels tripled, from 630,000 barrels in July to 1,815,000 barrels in August. September liftings were comparable with August and the fourth quarter program also will be heavy.

The recent liftings by the British of about 200,000 barrels of products daily has, as a matter of fact, been welcomed by refiners who were finding their tanks getting a bit full. It has been anticipated that the trend in last half oil demand in the United States would tend to flatten out and current figures appear to bear out this view. Without the recent British buying United States oil stocks would have increased by about 200,000 barrels daily, or crude runs to stills would have had to be cut back by about that amount.

On the West Coast, military demand has been an important factor in preventing an accumulation of stocks of either residual or distillate fuels. Rapid industrial growth in the west has contributed also. Since the outbreak of hostilities in Korea the West Coast industry has been relatively short of these products. The East Coast has not accumulated much of a reserve of residual fuel, but in the case of distillate fuels, refinery and terminal stocks are 50 percent above last year's levels and still rising. Refiners have built considerable new storage but still have found it necessary to convert tankage from other services to that of storing furnace oils. For the country as a whole it is possible that stocks of distillate fuels may reach something like 105 million barrels by the end of October. A year ago stocks were 85 million barrels and in 1949 the total was 90 million barrels.

Distributor stocks of distillate fuel also are abnormally high for this season of the year and dealers are doing their best to bring the level even higher. East of the Rocky Mountains, dealers' tanks were 69 percent full on August 1 compared with 46 percent a year ago according to a survey conducted by *Fueloil and Oil Heat* magazine. Dealers in northeastern states had their tanks 86 percent full compared with 51 percent in 1950. In Middle Atlantic states, tanks were 56 percent full compared with 37 percent last year. In the middle-west the situation was different. Tanks were only 43 percent full compared with 53 percent a year ago. In this area refiners were doing the pushing, trying to get distributors to fill up and relieve primary storage.

Distributor storage capacity is increasing at a moderate pace. After the transportation shortage in the 1947-48 winter there was an increase in capacity of eight percent and again last year another five percent was added, bringing present dealer storage room to 25,352,000 barrels. Oil in this tankage at August 1 this year was about 17 million barrels compared with 11 million barrels in August, 1950.

In its recent survey *Fueloil and Oil Heat* found that consumer storage is about at the same level as a year ago. An August 1 survey showed the average to be 60 percent full compared with 59 percent in 1950 and 66 percent in 1948, after the shortage scare. Average householder oil capacity is about 10 barrels which means that home storage on August 1 was 35 million barrels. Dealers are not selling as many large tanks to consumers now as they did after the recent shortage scare. In 1948 120,355 extra tanks were sold. The number dropped to 40,897 in 1949 and to 25,820 in 1950.

Anyone who tries to forecast furnace oil consumption in advance is in trouble at once unless he possesses a very clear crystal ball or is a close student of the condition of the pelts of fur-bearing animals in the woods, the width of stripes on the wooly-bear worms or other so-called advance weather signs. Recently the Atlantic Coast Oil Conference suggested that the 25.1 percent 1950 increase in demand along the Atlantic seaboard was due 14 percent to new burners and 11.1 percent to colder weather. For the coming winter the tendency is to suggest that demand may be up about 20 percent over the previous season, much of this being on account of a possible colder winter. Since the past three seasons have averaged about normal it is thought likely that the coming winter will be below normal.

Oil burner installations have been slower this year. In the first seven months last year 354,504 domestic burners were installed compared with 279,189 in the same period this year, a drop of 21 percent. July installations were 42 percent below July 1950. Dealers and manufacturers have very large stocks of burners which are not moving. For the year it is thought that new central heating installations will not exceed 600,000 after allowing for replacement of worn-out units and conversions from oil to other fuels. In 1950 sales of domestic burners and units totaled 846,815 of which 96,960 were replacements. In that year 68,256 burners were taken out, most of the switch being to natural gas. Net additions to installations were 681,599, bringing total at the year's end to 5,172,134.

Consumption per burner is tending to fall because of improved efficiencies and because of smaller homes. Adjusting for differences in degree days, the average consumption of central heating units per season in 1949-50 was 1,883 gallons compared with 2,100 gallons in the 1947-48 season. Residence heater loads now average about 1,540 gallons, commercial and apartment users 5,470 gallons. Burners of No. 1 oil take an average 8,780 gallons per year.

In view of the overall increase in world demand for oil this year of about 11 percent and the disruptive influence of the Abadan shutdown, transportation again has become a primary factor in supply of distillate fuels. Price control in the United States is a further complication. Independent distributors on the Atlantic Coast normally buy about 44 percent of their oil fob Gulf ports. They now are in trouble because marine freight rates are much higher while delivered prices are fixed. Result is that their margin on fob Gulf purchases has become a minus quantity.

Refiners are protecting their own interests in this situation by restricting cif shipments to last year's levels, or slightly above. This means that the anticipated 20 percent increase in demand will have to move at high freight rates with little or no profit unless the Office of Price Stabilization permits an advance in price. Independent cargo buyers of oil say that they handle about 40 percent of the business in the area, or around 64.4 million barrels and that they will not be able to buy more than 29.9 million barrels cif.

Although the rate of increase in distillate fuel demand for heating purposes may be

tending to flatten, there is no such tendency in the case of diesel fuel coming from the same cut. Diesel driven road vehicles and tractors are continuing to increase and, more important still, the dieselization of American railroads is proceeding at a dizzy pace.

On June 30 there were 11,161 diesel locomotives in the service of United States railroads, this compared with 7,155 on December 31, 1949. The increase in 18 months was 56 percent. In the first half of this year 1,836 new locomotives were added to the fleet. If the second half deliveries are as great, there will be 13,000 in service at the start of 1952.

Railroads had filed orders with suppliers for 1,588 locomotives as of August 1 compared with 1,106 on the same date a year ago, according to the Association of American Railroads. Totals by classes are as follows:

Type Locomotive	Aug. 1, 1951	Aug. 1, 1950
Passenger	114	35
Freight	635	492
Switch	765	520
Dual fuel	74	59
Total	1,588	1,106

Inventory in service June 30, 1951 compared with recent dates was:

	June 30, 1951	Dec. 31, 1950	Dec. 31, 1949
Switching	5,928	5,209	4,239
Freight	3,934	2,977	2,007
Passenger	1,299	1,139	909
Total	11,161	9,325	7,155

Railroad diesels are of particular importance to the oil industry because of their high use factor and high consumption per unit and per locomotive. The average switch engine consumes 1,190 barrels per year, the average passenger locomotive 12,800 barrels per year and the average freight locomotive 10,340 barrels yer year. The weighted average consumption of the 8,241 average locomotives in service last year was 5,400 barrels. Total for the group was in excess of 44 million barrels. Studies of consumption indicate that switch engines consume 1.14 gallons per mile, passenger locomotives 1.49 gallons per unit (not per locomotive) per mile, and freight 1.86 per unit per mile.

It may be noted in passing that the railroad diesels consume a large amount of lubricating oil. A survey of 20 carriers made by *Railway Age* magazine showed a consumption range of 0.77 to 1.48 percent of fuel. Average was 1.045 percent of fuel in volume. On this basis diesel lube consumption of all United States railroads last year was about 450,000 barrels.

In the first six months of 1951 United States railroads bought 28,158,000 barrels of diesel fuel, according to the Interstate Commerce Commission. This compares with 21,881,000 barrels in the first half of last year. The increase was 28.7 percent. Indicated railroad diesel fuel consumption this year is 60 million barrels and for 1952 the estimated total is 77 million barrels.

Total diesel fuel deliveries from U. S. refineries in the first half were 62,737,000 barrels compared with 49,949,000 barrels in the first six months of 1950. Increase was 25.6 percent. This indicates that the growth in other than railroad diesels is a little less rapid.

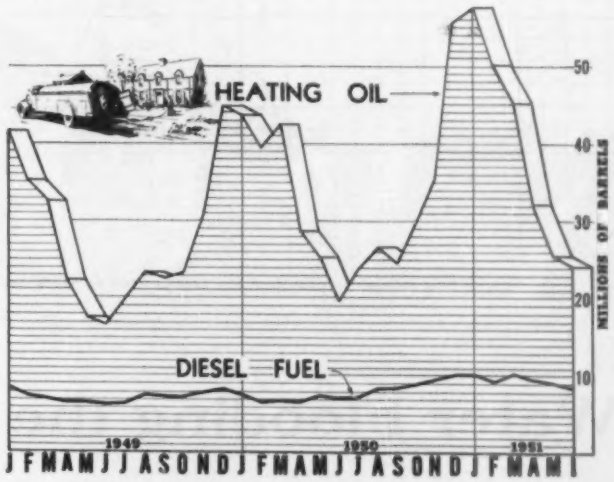
Diesel Progress magazine reports that by 1952 there will be 12.3 million horsepower of installed diesel stationary plants consuming 20.3 million barrels yearly and that marine diesels with 14.85 million horsepower will consume 27 million barrels. Added to these are 63,700 highway truck and bus diesels which will burn up about 20 million barrels and 85,000 tractors and construction equipment units with 14.8 million horsepower consuming 31 million barrels per year. These figures, when combined with the projected railroad demand, suggest that the industry will be called on to supply about 176 million barrels of diesel fuel in 1952 compared with 107.5 million barrels in 1950 and 62.7 million barrels in the first half of 1951.

A desirable feature of the diesel fuel business is the lack of severe seasonal fluctuation. Deliveries are almost on a level basis compared with a 5 to 1 ratio between cold and warm seasons in the case of distillate fuel oils.

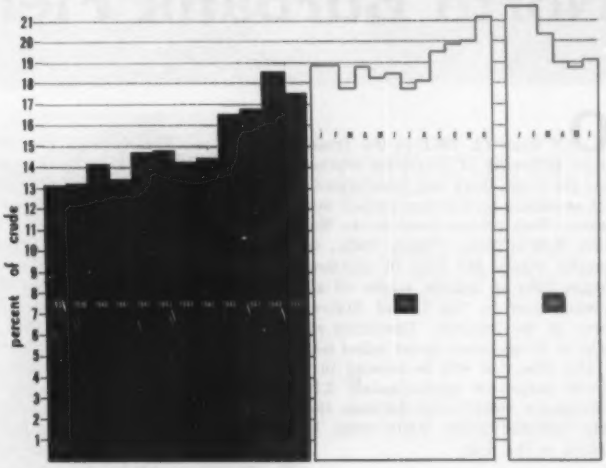
With the growing diesel fuel business and an enlargement of storage capacity, the oil refining industry is better able to keep its yields of middle distillates on a steady basis. A few years ago there was a very marked difference between winter and summer recoveries. This year the yield of distillate fuels was high at 21.7 percent of crude in January and dropped to 19.1 percent in June. Average for the period was 20.1 compared with 19 percent in 1950 and 17.4 percent in 1949.

In a recent address before the American Chemical Society's annual meeting, Dr. J. Bennett Hill of Sun Oil Co. pointed out that American homes now burn 11 percent of the nation's crude output in their furnaces. He reviewed methods which have been adopted to make cracked fuels suitable for this market so that the supply could be stretched. These involve chemical treating methods and the inclusion of additives such as amino compounds or metal soaps to inhibit sludge formation or peptize sludge so that it will not clog screens. With diesel fuel demand now rising at 25 percent yearly, similar efforts are being made to enlarge the portion of the oil which is suitable for diesel fuel.

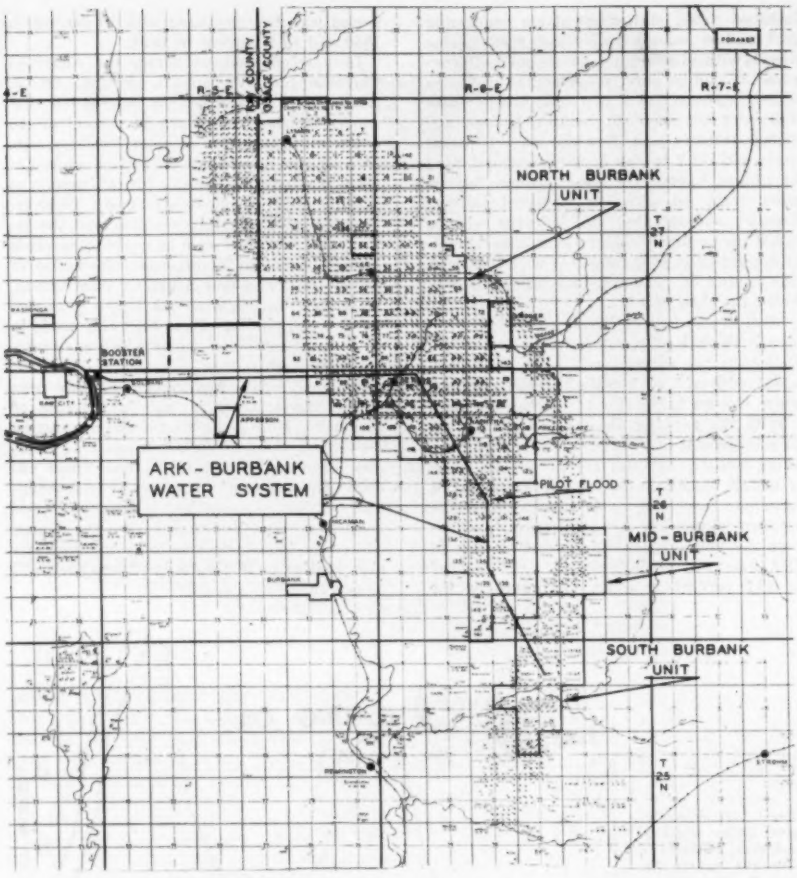
While distillate fuel recoveries have been rising, the contrary is true in the case of residuals. More and more refiners are cutting deeper into the crude to obtain cracking stock, diesel fuel and furnace oil. This trend undoubtedly will continue as far as is economically feasible with residual fuel becoming less and less a competitor of coal. For the coming winter the industry seems to be in a comfortable position on distillates but heavy fuels will be scarce.



Diesel fuel deliveries have little seasonal variation compared with the nearly 5:1 ratio in the case of furnace oils. Chart shows refinery shipments.



Current refinery yield of distillate fuels is about 55 percent greater from each barrel of crude than before World War II.



Map showing location of pilot flood and area covered by North Burbank unit.

Water Flooding the North Burbank Field

ON June 12, 1951 in the presence of a large gathering of petroleum representatives and the press, there was inaugurated the largest secondary oil-recovery project ever undertaken. This project involves the North Burbank field in Osage County, Okla., where the royalty rights are held in common by the Osage tribe of Indians, whose oil affairs are administered by the United States Department of the Interior. Operating rights are held by 18 operators under tribal leases.

The area that will be covered in the completed project is approximately 2,100 acres (36 square miles). At the time the project was initiated about 2,200 wells had been drilled in the field.

The Burbank Pool was discovered in May, 1920. The pool was extended fairly rapidly and by the end of 1926 development of the main part of the pool was considered complete. Wells were producing under wide open production methods, flowing, swabbing, and pumping the wells to capacity. There was then little knowledge of present-day practices that would conserve gas in this typical gas drive reservoir, where all production is dependent upon the degree of pressure maintenance. Peak production was 122,000 barrels per day in July, 1923. After passing the peak, the field, in typical fashion, declined rapidly as a result of the open flow method of production. Production from the field has been 225 million barrels, and that part of the field lying in Osage County, Okla., now embraced in the North Burbank Unit, has produced about 170 million barrels of oil.

The producing formation is the Burbank Sand, of Pennsylvanian age, which was deposited along the western shore of the Cherokee Sea and is a large sand lens composed of many overlapping bars. Narrow sand bars parallel with the shore line were built by waves and shore currents. The margins of the bar feather out into fine grain sediment of the adjacent deposit, but the longitudinal zone in the middle of a bar consists largely of well sorted, clean sand, and would accordingly be the most highly permeable part of the sand bar. During the long time required for deposition of such a large sand body the crest of many bridges were planed off by waves, wind, and rain, and the swales between the ridges were filled, thereby destroying the surface relief of many of the bars, but the permeability and other characteristics of the sand persisted in the undestroyed parts of the bar. The sand is composed largely of fine and medium grained quartz cemented with silica, dolomite, and calcite. In addition there are present small amounts of mica, carbonaceous matter, five percent of silt and clay, and 10 to 20 percent of rock fragments of chert, shale and schist.

The reservoir energy of the North Burbank Pool was supplied almost entirely by gas dissolved in the oil. In only one area, the northwestern edge of the pool, along a three-mile tract, was there evidence of water encroachment, but due to the limited extent of the water-sand and body west of the pool, the expansive power of the water was rapidly dissipated, and up to the present time has advanced only about three-quarters of a mile into the pool proper. The beneficial effect of the water has been substantial and later gave impetus to the plan to water-flood the main body of the pool. The water flood program has been in existence at least on the part of one operator since 1936. At the time of unitization the reservoir pressure was practically depleted, ranging from 0 to 10 psi. The original pressure of the pool is unknown, as it was not measured, but was probably of the order of 1,200 psi. The dissolved-gas expansion drive is relatively ineffective, and pools which have only this type of energy are best suited for the application of artificial water flooding practices.

There was no initial gas cap existing in the high part of the structure; a few gas caps appear to have existed however in localized areas where the sand tops were high. The abundance of wells in all parts of the pool in which oil and gas were found at the top of the sand proves the non-existence of any extensive initial gas cap. In fact, the largest gas producing wells were located in Kay County, which is the lowest area of the field, structurally, and are possibly attributable to a stray gas sand immediately above but not connected with the oil sand.

Gravity of the oil was originally 40° API, but has declined to 37° to 38° API because of application of vacuum and dry-gas injection.

Thickness of the North Burbank sand averages 43 feet for the entire field and the unit area comprises 900,000 acre feet of sand.

Some operators inaugurated gas repressure

operations on a limited scale as early as 1926, in an effort to halt the decline of oil production. Gas repressuring operations did not become important, however, until 1935, when gas from outside sources was first purchased for injection into the reservoir. Up to the present time, in addition to returning the available residue gas, more than 17 billion cubic feet of natural gas has been purchased for injection into the reservoir. This operation has been successful and has resulted in increased recovery of approximately 17,500,000 barrels of oil.

With natural depletions retarded by the limited gas repressuring program, the recovery of oil from this reservoir has been in the neighborhood of only 25 percent of the oil initially in place. With that low recovery there was obviously a challenge to the industry to take steps to increase the ultimate recovery. It is from that viewpoint that consideration of the water flood operations arose.

Early in 1947, at the insistence of the Secretary of the Interior, the North Burbank operators started negotiations to unitize the various leaseholds into a single lease to be operated by one of the parties of the unit. Under the tribal policy, that part of the North Burbank field located in Osage County amounted to a common royalty interest and was the primary reason that prompted the North Burbank operators to limit the unit to those lands situated in Osage County. The unit excludes that part of the North Burbank Pool located in Kay County, Okla., which is operated as separate leasehold estates and diverse royalty interests.

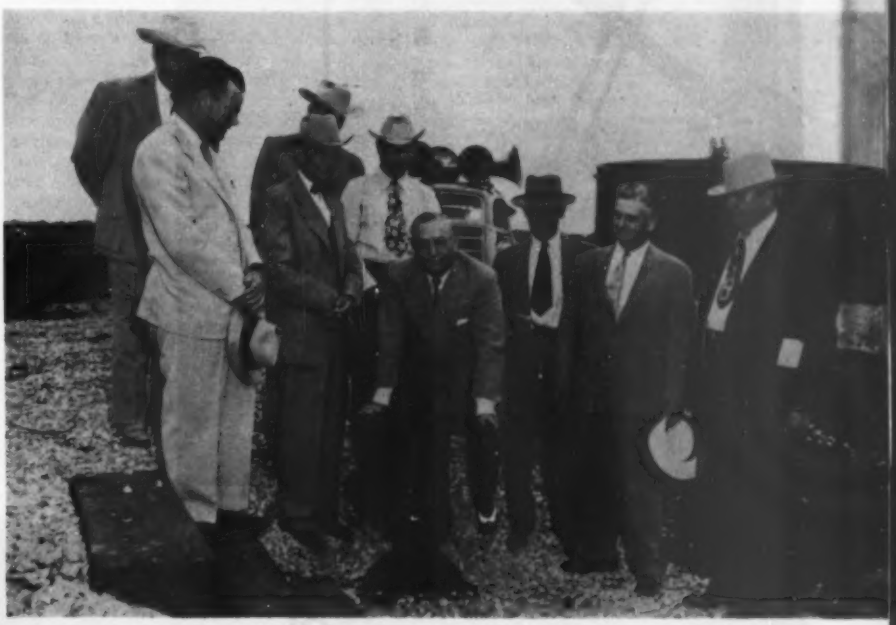
At the time oil leases were granted on lands comprising the North Burbank unit the Osage tribe had a policy of granting leases that bore a one-sixth royalty interest. These lands, at a one-sixth royalty, were not competitive with other leases held by the North Burbank operators in counties outside Osage County that were suitable for water flooding, and the operators asked the tribe to make an adjustment in the royalty.

Operating interests were unitized on the basis of accumulated production, current production, and productive acreage, all three factors being given equal weight in computing unit interests. There were 18 separate operators owning leases that comprised the North Burbank unit. The operators drafted an operating agreement among themselves, with interest determined by the above-mentioned factors. The operators further petitioned the tribe to substitute a blanket oil mining lease to replace the individual leases under which they had previously been operating.

The unit became effective November 14, 1949, with the approval by the Department of the Interior of the blanket oil mining lease covering the unit area and granting reductions in royalty from one-sixth to one-eighth of the reserve to be recovered by the water flood process.

In December, 1949, immediately following the issuance of the blanket oil mining lease on November 14, 1949, the North Burbank operators started the development of pilot water flood. Approval of a blanket South Burbank lease is expected to permit flooding in that part of the field before the end of this year.

Because of the size of the North Burbank undertaking, the unit leasees commenced a 90-acre "pilot" operation in February, 1950, in order to get necessary operating information to design and carry on the type of operation required to water-flood the entire field. Nine input water wells were drilled on a five-spot pattern to the existing 16 producing wells on this area. First water was injected on February 25, 1950. The first response to water flooding on the 90-acre pilot tract occurred in September, 1950, after 1,200,000



▲ Turning on the valve opening Burbank field waterflood operations is George Labadie, Osage council member. Others are (l. to r.) Andrew Gray; Wm. O. Cooper, Osage tribal council secretary; Ed Simpkins; Dave Ware; Charley Carter; Joe Revelette; Ben Harrison and Jim Tayrien. All except Cooper are members of the Osage Indian tribal council.

◀ Skidding a jack-knife rig from one water input well location to the next.

barrels of water had been injected, when the production from the 90-acres was raised from 37 barrels per day to 404 barrels per day. The peak production on the 90-acre tract was reached in January, 1951, at 987 barrels per day. As of June 1, 1951, 170,000 barrels of oil have been recovered as a result of the water flood operations on the 90-acre tract. The rate of production on that date was 675 barrels per day.

Water for injection on the 90-acre tract was obtained from salt water produced on the unit and from an industrial water source that represented temporary arrangement. For that reason there were times when the supply of water was limited or when weather conditions interfered with the injection on the pilot tract.

The oil reserve to be recovered was computed by the difference in oil saturation at the time of unitization, and a residual oil saturation of 23 percent of the total void space after water flooding. The residual oil saturation after water flooding was determined from cores taken on flooded-out properties of similar sand characteristics.

The total sand volume was determined from driller's logs, using as control some 14 core tests that had been drilled in the field. Driller's logs were interpreted for 2,210 wells in the field upon which data were available. To determine the positions of the top of the sand, the top of the oil saturation, and the base of the oil sand, 14 cross sections at intervals of two-thirds of a mile and one longitudinal section were drawn. These data were used to prepare an isopachous map, assigning the greatest weight to the cored wells and next to the cross sections rather than individual well locations in order to minimize errors in determining sand-thickness which are usually associated with driller's logs.

Unfortunately, there was no information as to the solubility of gas in the oil, or the formation volume factor for the North Burbank field; these data were available, however, from the South Burbank field and were used in the computation of original oil in place in the North Burbank unit. Porosity values were taken from the core analysis and weighted as to the location of the core test within the unit.

From the above data it was computed that there were 140 million barrels of oil to be recovered from the North Burbank unit by water flooding. This reserve figure is also in close agreement with the yardstick commonly employed in water flooding, using accumulated production and adjusting for the volume of oil that has been produced by gas repressure.

Water flooded operations on the North Burbank unit would ultimately require a maximum of 300,000 barrels of water per day, and investigation of the possible sources of water demonstrated that the most economical and reliable source was the Arkansas River, located some seven miles west of the unit. The preliminary design of the water system to supply the North Burbank unit with water showed that there would be substantial savings to the operators in the surrounding pools by construction of a joint water system adequate for the whole North Burbank unit, together with the properties in the Stanley Stringer, Mid-Burbank unit, South Burbank unit, and the properties located in the Fairfax Pool. The amount of water here involved would meet the normal requirements of a city of 75,000 people.

Pumping - jacks of this type are being replaced by modern pumping units. Derrick of water input well is in the background.

Laying main water line from the Arkansas River to the pilot flood area in North Burbank, Oklahoma, field. Project required 2,500 tons of steel.

Twenty-eight oil operators in the above-mentioned pools and units joined in the formation of the Ark-Burbank Water System for the purpose of supplying water for water flooding in the Burbank area. The Ark-Burbank Water System is designed to deliver 300,000 barrels per day for water flooding. The design was based on the nominations submitted by all of the operators as constituting their peak demand in the course of water flooding their properties. The installation cost was apportioned among the operators on the basis of their water nominations. The operating expense is to be apportioned on the basis of actual volume of water delivered during the month.

Source of water is from wells drilled to the alluvium along the banks of the Arkansas River. These wells are drilled to the bedrock, and some 40 feet of water bearing sand and gravel is exposed in the well bore. These wells have been tested to a capacity of 40,000 barrels per day. At that rate the water is clear, demonstrating that adequate filtering obtained by drawing the water through the sand and rock, makes unnecessary the installation of surface filters. The mineral content is such that no deposition is expected from the water, and treatment will be limited to the injection of a bactericide to prevent the growth of organic material.

Water from the water wells is pumped to a 40,000-barrel collector tank to provide settling of sand in the event sand is produced with water. From the collector tank the booster station will pump the water through the line system at such pressure as to provide a pressure of 25 psi at the wellhead of any well served by the Ark-Burbank Water System. The system constitutes seven miles of 30-inch line running from the Arkansas River to a point in the approximate center of the North Burbank field, and an additional five miles of 24-inch line running south in the North Burbank field with an extension of three miles of 18-inch line to the South Burbank field. From this central trunk water system other lines will be laid by the respective unit operators to expand the system to all points of use. The North Burbank portion of this water flooded system was put into operation on June 12, 1951.

The main water line from the Arkansas River to the pilot flood area in the North Burbank field consumed 2,500 tons of steel, enough to build a large modern U. S. destroyer;113 freight cars were required to transport this steel. Many more thousands of tons of steel are required for the pumping equipment, new tanks, and the miles of pipe line that will have to be laid in an operation of this type.

The spirit of cooperation on the part of the operators demonstrated by the joint construction of a single water system has resulted in an important conservation of steel as compared to the construction of three or more water systems from the Arkansas River.

The North Burbank operators are going forward with the enterprise and are at present developing 1,000 acres for water flood.

The Burbank field was originally developed on a regular ten-acre spacing. The old wells are available for use in the water flood program except for some 400 wells that have previously been plugged. The pilot water flood was developed by drilling five-spot water input wells to the existing wells, creating a ten-acre spaced pattern. Performance of the water input wells on the pilot water flood demonstrated that adequate volumes of water could be injected into the wells under a hydrostatic head in volumes ranging from 1,000 to 2,000 barrels per day, or from 15 to 30 barrels of water per foot of sand per day.

In view of these injection rates the operators elected to employ a 20-acre spaced pattern for expansion of the pilot flood. The 20-acre pattern is accomplished by converting alternate existing wells to water input. The original wells were completed by setting seven-inch casing some 200 feet above the top of the sand and running a 5½-inch liner below that point. In only rare instances was the liner set at the top of the sand. Such well completions make it imperative that water input wells be completely reworked to the extent of salvaging the seven inch casing and liner, and running a new casing string to the top of the sand, and cementing. The sand top is located by means of radioactive logs.

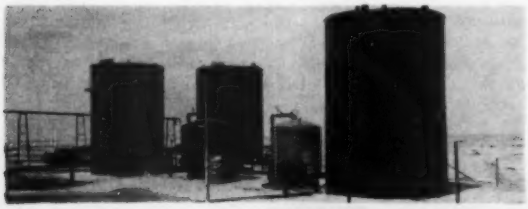
The existing old equipment was designed and installed for a continually declining oil field. It will be necessary to replace all existing equipment on the lease as water flooding is expanded. Central powers and jacks are being replaced by pumping units; new tank batteries are being constructed of some 3,000 barrel capacity on each quarter section. Tubing, rods, and subsurface pumps are being installed of sufficient capacity to produce 800 barrels of fluid per day. The cost of this water flood development will be equal to the cost of initially developing a property such as the North Burbank oil field.

Waterflood production in the North Burbank unit was averaging 1,000 barrels of oil per day by mid-August. The increase is due to the development of additional acreage immediately surrounding the 90-acre pilot flood area. Peak production from the 1,000-acre extension is expected to be reached in the latter half of 1952, ranging from 6,000 to 7,000 barrels per day.

Currently 100,000 barrels of water a day are being delivered for injection in the project from the 30-inch pipe line from the Arkansas River. Temporary pump units which were operating at the river station previously were replaced by permanent equipment in August. Previously delivery rate was 50,000 barrels of water daily. The 1,000-acre extension, when completed, will include 55 water injection wells.

Present plans call for the water flood development of 1,000 acres per year. A reasonable expectation is that through water flood operations, according to this plan, the daily production from the field can be raised from a level of approximately 4,500 barrels per day to approximately 20,000 barrels per day and be maintained at that higher rate for at least 13 years in the future. The additional oil recovery expected from the North Burbank unit as a result of water flood to be undertaken is 140 million barrels. This volume is comparable to the 170 million barrels recovered by natural depletion and gas repressuring from the unit area prior to unitization. Therefore, this development made possible by the royalty reduction, will not only substantially increase the revenue to the Osage tribe, but also represents a great conservation move in the state of Oklahoma.

Thus, a depleted field is being restored to a level of production by modern methods, with the prospect that almost as much oil will again be produced as was produced in the now outdated system of the industry where only the natural forces of production were relied upon. By supplementing nature's forces through the injection of water, a great conservation step is achieved. There will result from this operation alone a substantial addition to the nation's crude oil reserve and a substantial addition to the mineral wealth of the Osage Indian tribe. These are the essential elements marking the importance of the beginning of large scale waterflooding operations in the North Burbank field. The influence of the project is marked, in that the waterflood possibilities of the entire Osage nation have been brought to the attention of the oil industry. Currently in excess of 54,000 acres of leases are subject to this type of operation. In time, many of the depleted pools in Osage County will be subjected to waterflooding, and there is every reason to believe that ultimately as much oil will be produced from the area as will equal the approximately 600 million barrels that have been produced to date.

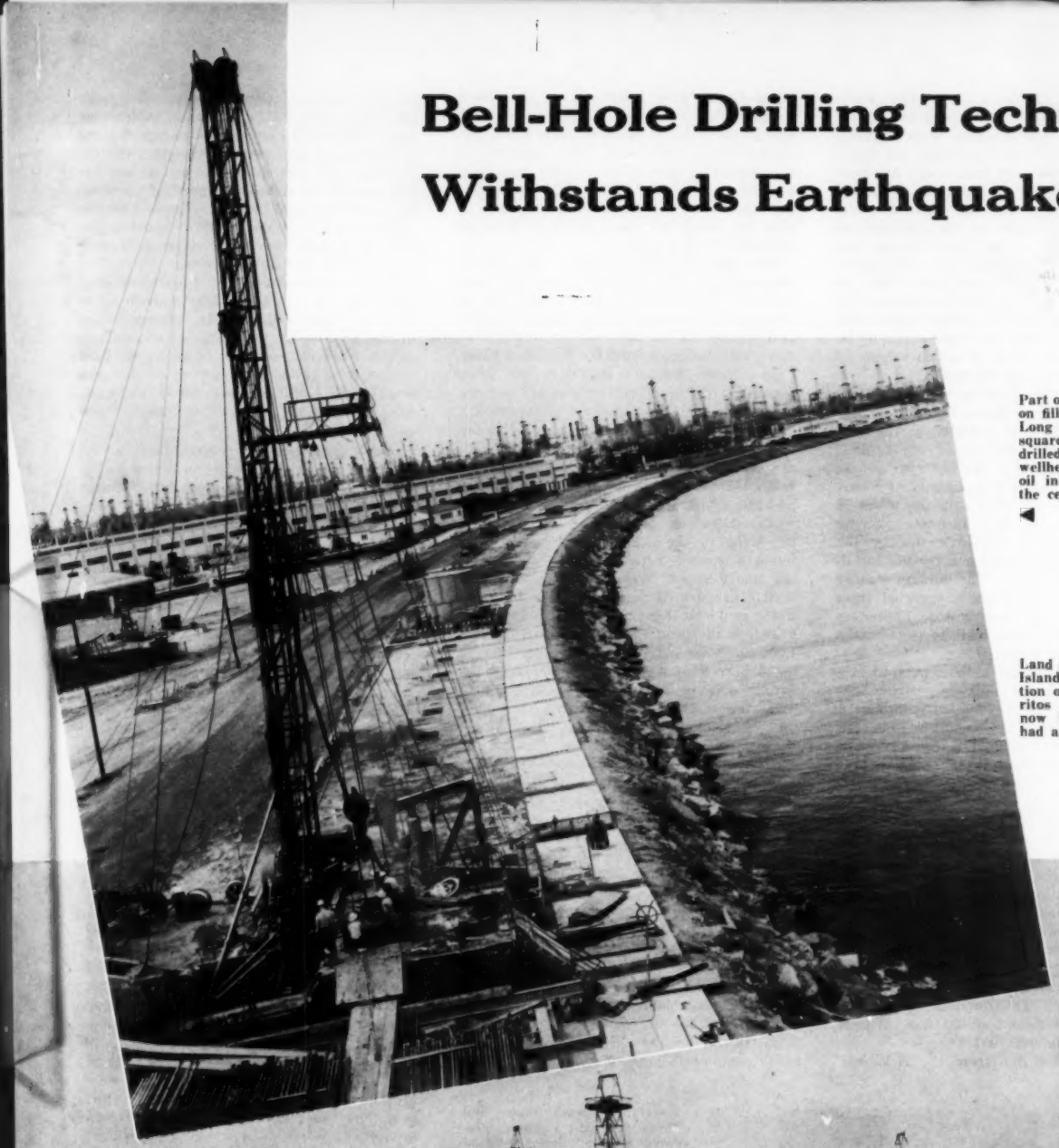


Battery of wash tanks and filters for return water produced on the pilot waterflood project.

Oil produced from the pilot flood area is stored in these tanks until it can be transported to refineries. Each quarter section is being equipped with a new battery of lease tanks for accumulation of crude.

Bell-Hole Drilling Technique Withstands Earthquake Test

By L. P. Stockman

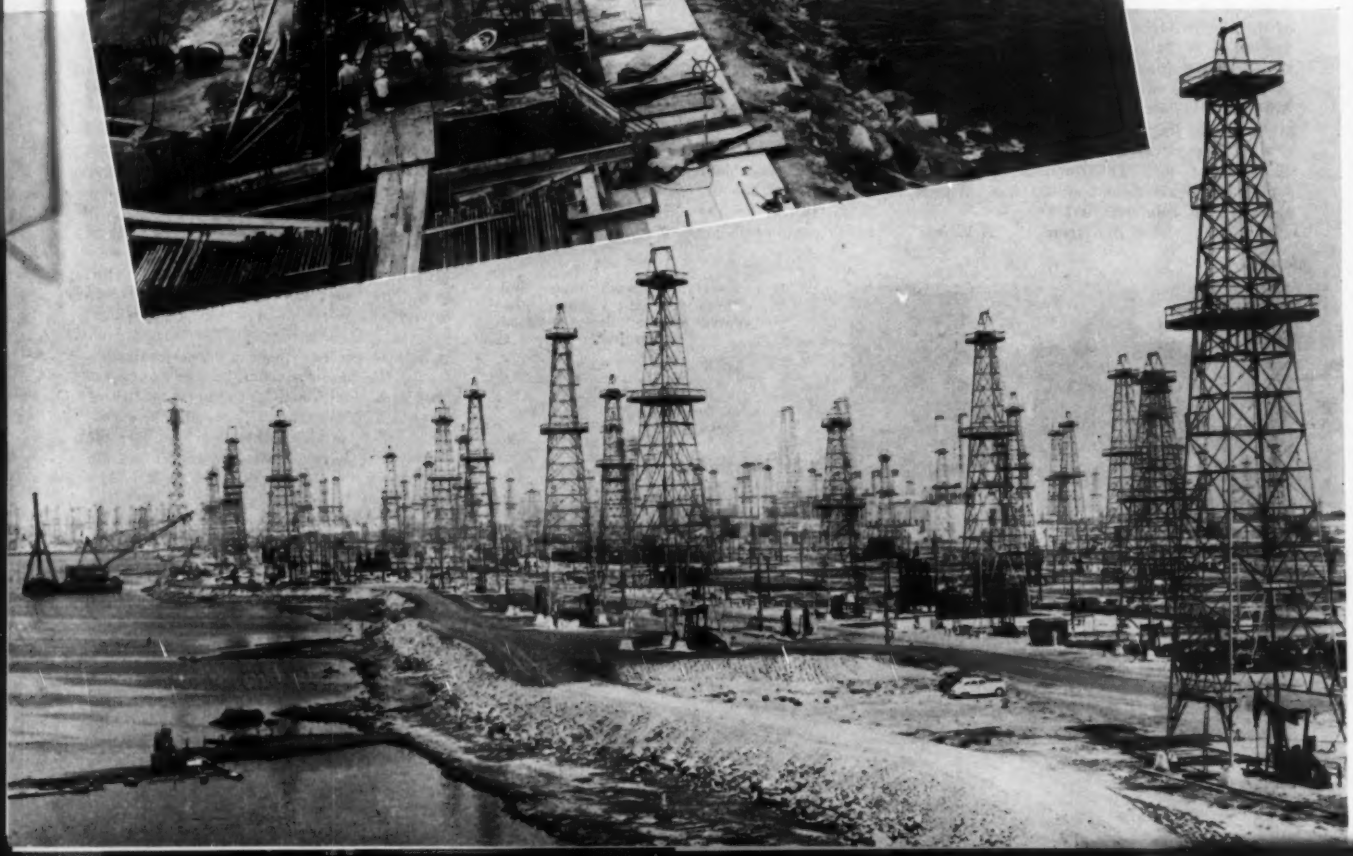


Part of Richfield development on filled land extending into Long Beach Harbor. Dark squares mark directionally drilled wells. Underground wellhead pumps force the oil into service lines under the cement surface at right.

◀

Land subsidence on Terminal Island necessitated construction of this dike along Cerritos Channel. This area, now below sea level, once had an elevation of six feet.

▼



IN mid-August, earth shocks, technically described as subsurface subsidence and compaction, seriously damaged and put out of production a large group of oil wells in the Wilmington field of the Los Angeles Basin, Calif. Similar quakes in 1947 and 1949 caused extensive damage in the same area and led to the adoption of what is known locally as bell-hole drilling in an effort to avoid the shearing or pinching of casing and tubing by movement of the surrounding earth.

By drilling large diameter holes, usually 26 or 30 inches, operators believed that a moderate horizontal movement of the formation could be withstood without shutting off production. In this, the first serious test of the theory, it is perhaps significant that none of the bell-hole wells was damaged. This is not considered conclusive, however. Only time can tell how effective this drilling system will be. Obviously, if a slip of five feet occurred it would not save the well, but all movement to date has been about one foot horizontally.

The latest settling and horizontal shearing in the Wilmington field which occurred on August 15 last involved a total of 29 wells and will represent a loss of about $2,000,000 if they are found to require redrilling. It may be several weeks before the full extent of the damage is definitely determined but it is believed that most of the wells which stopped producing at the time of the movement have been damaged sufficiently to require extensive remedial work. Union Pacific Railroad was the hardest hit with 25 wells down followed by Richfield Oil Corporation with three wells and Signal Oil & Gas with one well.

The first of recent earthquakes in December, 1947, and the second in November, 1949, had their epi-centers on Terminal Island. The latest disturbance is north of Terminal Island and north of Cerritos Channel and some of the wells are producing from beneath the channel itself. The Wilmington-Long Beach harbor area has been gradually settling for 15 years but it is only in recent years that the rate has been greatly accelerated. The general area is still subsiding at a slow rate but this is stepped up periodically when there is a shifting of the rock mass. The affected area is about one mile long by one-half mile wide and the greatest degree of settling is in the center of a general subsidence. This concentric area has subsided approximately 12 feet and circling this elliptical shaped sink a second line can be drawn to show a 10 foot settling. A third circle will reveal a subsidence of from seven to eight feet and a fourth circle would represent a drop of about six feet. The inner sink which has subsided faster than the surrounding area is located on Terminal Island and the concentric lines grow larger and larger and encompass more land. The subsidence and compaction is accompanied by a counter-clockwise horizontal shearing that produces substantial damage at approximately 1,500 and 1,700 feet respectively. The impact is apparently of short duration rather than a slow pinching movement as high stresses are set up.

The area showing the greatest settling on Terminal Island is that surrounding the Southern California Edison steam generating plant where a subsidence of about 12 feet has occurred. This $40,000,000 steam electric generating plant would be under water at the present time except for the fact that the company has constructed new deep foundations and has erected dikes to keep out sea water. The Ford assembly plant is located on ground that has settled about eight feet and officials have constructed high dikes to keep out sea water and have installed pumps to discharge seepage beneath its floor. Both of these plants are located immediately adjacent to ship channels. Union Pacific Railroad has built wide earthen dikes all along Cerritos channel and extensive repairs have been necessary on roads which have buckled.

In 1947 this general settling severely damaged a large number of producing wells of Long Beach Oil Development Co. and five wells of Union Pacific Railroad. In November, 1949, producing wells of both Long Beach Oil Development Co. and Union Pacific Railroad were severely damaged, some beyond repair. In the latest slippage, in August, 1951, Long Beach Oil Development Co. apparently escaped damage although there may be some minor disturbance which was not extensive enough to affect production. Amount of horizontal slippage in the latest movement has not yet been determined but in 1949 the lateral horizontal movement was approximately one foot, enough to pinch casing, tubing and rods and in some cases to partially sever casing.

This distortion usually is restricted to a vertical section of about 50 feet and the pinching and bending is limited to a relatively few feet within this 50-foot section. This occurs at 1,500 feet and again at 1,700 feet, the latter movement being the more severe. Slippage may occur at one or the other of the depths but rarely at both in the same hole.

Most of the subsidence damage in the November 1949 earthquake was at the lower level. As soon as sufficient wells have been entered, Union Pacific Railroad engineers will be able to localize the impact. This is a slow process, however, and it may be several weeks before it is pinpointed.

Long Beach Oil Development Co. has adopted a policy of redrilling damaged wells from the conductor string and employs the practice of providing large diameter holes as far as possible through the danger zone. A gel substance is placed in the annulus between hole and casing to absorb as much of the shock as possible and to maintain the annulus. Union Pacific Railroad has adopted the practice of starting all new wells with 30-inch diameter casing and then carrying a 26-inch hole well below the slippage plane. Not a single well, employing this technique, was damaged in the recent disturbance and Union Pacific officials are sanguine over the possible outlook. While they recognize the fact that only the future will tell the entire effectiveness of this technique they are hopeful they may have temporarily solved this perplexing and costly problem.

In drilling 30-inch holes, the company drills an 18⅝ inch hole to around 200 feet and then opens it to 36-inch and lands 30-inch casing. After drilling out the 30-inch casing shoe the company drills a 12¼ inch hole to 2,000 feet, about 300 feet below the slippage plane. The diameter of the hole below 2,000 feet is then reduced to a normal size, depending upon the size of casing to be landed, and then drilled ahead to the cementing point. The upper 2,000 feet of hole is then opened to 26-inch diameter and casing is landed and cemented in the usual manner. A port collar is installed about ten feet below the 26-inch hole for cementing, following which the annulus between the oil string and wall of the 26-inch hole is packed with an emulsion type mud which is tested at frequent intervals by a specially designed thief. Characteristics of this gel are extremely low water loss and very high gel strength.

When the latest blow fell, operators had not fully recovered from the effects of the November, 1949, earthquake which damaged a total of 270 wells and entailed a loss of about $10,000,000 for remedial work and redrilling activities. Many of these wells which were badly damaged were redrilled from the bottom of the conductor string, usually landed at about 400 feet, but other wells were abandoned because they would be too costly and time consuming to reclaim. Union Pacific Railroad recently abandoned a total of 30 wells which were damaged in the November, 1949, disturbance on Terminal Island. A number of replacement wells have been drilled and this work is continuing. In redrilled wells, the hole is always opened up through the zone of high stress.

During 1950, a total of 154 wells were redrilled in the Wilmington field and during the first seven months of 1951 an additional 45 wells were redrilled. This work is still continuing but at a slower rate. Redrilled footage was 344,029 feet in 1950 and 70,923 feet for the first seven months of the current year. This is an average of 2,234 feet in 1950 and 1,576 feet in 1951. This reduction in the average is due to the fact that some wells originally completed in the lower Terminal zone were subsequently redrilled and recompleted in the overlying Ranger or upper Terminal pools following the settling in November, 1949. In addition to this redrilling work, a number of replacement wells have been drilled, principally by Union Pacific Railroad.

D. L. Roberts, Chief Petroleum Engineer of E. B. Hall & Co., Los Angeles, Calif., in a technical paper pointed out that, "following the earthquake, remedial and recovering processes were evaluated both from the point of view of mechanical effectiveness and of economics. A series of experiments were conducted on surface test specimens and on wells. From these it was concluded that any attempt to repair wells from the inside by milling and swaging inside the casing was unlikely to succeed due to the type of deformation encountered. Lateral slippage usually results in the offsetting of two more or less parallel limbs of the casing. As a result, attempts to remove the constriction by milling or swaging almost invariably results in cutting or breaking the side wall or pipe, thus permitting the tool to follow a prolongation of the axis of the upper limb, rather than the axis of the bend.

"Special tools were designed and built for washing over and recovering casing as large as 11¾ inches. These consist of specially built drag type and roller cutter type washover shoes, heavy wall 16 and 20 inch washover casing fitted with tool joints, an external casing cutter and a flexible section washover casing. The latter is made of a series of interlocking cast steel rings; the joints permit a deflection of approximately two feet laterally at the bottom of a 10-foot section of the

Ford power plant in Wilmington field showing new dike. Portions of this plant have settled as much as six to eight feet.

Dike around Union Pacific wells in Wilmington Field was constructed to keep out encroaching sea water at lower left.

casing. Each joint is sealed with a rubber inset sleeve so that circulation can be maintained through the section."

Operations in the Long Beach harbor section of the Wilmington field have been of an outstanding nature due to a common sense approach to the problem. Good engineering practice has been employed throughout and successful operation has resulted. Shortly after completion of the first producing well in the Long Beach harbor section, General Petroleum's Ford 1, and before any additional drilling permits were issued, the Long Beach Harbor Commissioners approved stringent regulations with which all operators were obliged to comply. This was to prevent any possibility of the creation of objectionable conditions and to provide regulations for drilling and production activities. Operators approved this plan and have lived under it to date.

Long Beach Oil Development Co., a municipally owned concern, is the largest operator in the Wilmington field due primarily to its extensive tideland and on-shore holdings. Early in the life of the field, certain operators were successful bidders for municipally owned acreage and tidelands and continue to retain these leases. The most recent lease is one which was awarded to Richfield Oil Corporation. This lease gives the City of Long Beach all but a very small percentage of production which accrues to Richfield to cover administrative and operating costs. This division is made after the wells have paid out and in effect means that Richfield drilled the wells for the city. The advantage to Richfield is that the company is entitled to purchase all oil produced from parcels A and B, the wells of which are bottomed beneath the city's tidelands. Much, if not all, natural gas produced on city owned property is delivered to Long Beach's municipally owned gas company which serves the residents of the city.

Union Pacific Railroad Co. is the second largest operator in the Wilmington field by reason of its extensive fee holdings and operating agreements with Southern California Edison Co. and others. Both Long Beach Oil Development Co. and Union Pacific have been favored with capable and efficient executive personnel and the field staffs of each are engineers of outstanding ability. Possibly because of the involved tideland problem, Long Beach Oil Development Co. has been reticent about releasing field data. This is hard to understand because the company has done and is doing an outstanding and remarkable job.

Whether the Long Beach harbor section of the Wilmington field will ever reach an equilibrium and come to rest during the remaining producing life of the field remains to be seen. Unlike most other fields Wilmington is divided into numerous individual blocks by faulting that is deep seated and it is not difficult to visualize the possibility of continued movement until an equilibrium is attained. These blocks, for the most part, are separate pools, there being no drainage from one block to another. Each is a separate entity, although the various productive sands are laid down in regular order, indicating the probability that the faulting occurred after the accumulation of oil and gas. There have been many explanations of the Wilmington phenomenon and many solutions advanced but most have been too involved. Wilmington operators are primarily interested in drilling and producing oil and gas and safeguarding their wells and equipment and would not go for a survey that might cost $500,000 and involved the drilling of several wells. That the entire area has not reached an equilibrium is evidenced by the fact that even in the city of Long Beach certain sections have been settling for a long time and at Wilmington there is a section that momentarily threatens to slide into the sea.

There is nothing new about the shifting and settling of acreage in oil fields but Wilmington has a little something added. In the Midway-Sunset field of Kern County there is an area that has been moving for many years due to an active fault. Pipe lines laid on the surface have been shifted several times and operators have solved the problem by providing room for the surface formations to move past oil well casings. This was a relatively simple problem because the movement was close to the surface and thus easily solved. At South Mountain there is another slowly moving mass and the shifting grass in the Ventura Avenue field is a matter of record. This has been arrested for the most part by the digging of tunnels to permit excess water to escape from underground formations. Because of the elevated area involved it was possible to employ this technique of solving a difficult problem.

The outcome of legislation affecting tidelands will have a direct bearing on future tideland production in the Long Beach harbor section of the Wilmington field, because if the city's title to the tidelands is confirmed we may anticipate increased development. Long Beach Oil Development Co. has just started work on a new group of 125 wells which has been made possible by enlargement of a reclaimed area. Also within the realm of possibility is the construction of two drilling islands inside the breakwater from which another 500 wells could be drilled to reach out farther to tap that portion of the tideland accumulation presently out of reach of upland locations. This is contingent upon recognition of the so-called three mile limit beyond the high tide line. Theoretically that portion of the accumulation which might lie outside the breakwater would become state tideland, but the absence of suitable drilling locations would void this advantage.

Paradoxical as it may seem, the federal government is considering the advisability of instituting action against the city of Long Beach because of drainage of alleged federal tidelands. Several fault blocks, mentioned above, extend out into the tidelands for a distance not definitely known. Directionally drilled wells from upland surface locations on these fault blocks are alleged to be draining the undeveloped portion of the tideland accumulation which the federal government is contesting. A year or so ago, a Federal Master outlined what he considered to be the tideland area which the Supreme Court ruled belonged to the federal government because of "paramount rights in and dominion over." The federal government now alleges drainage across that theoretical line and wants an accounting for oil and gas removed therefrom. Action will be held up pending a forthcoming Supreme Court decision.

Moving Day In Toledo

A UNIQUE tower moving job was recently done at the Toledo, Ohio, refinery of Sun Oil Co. in connection with the erection of a new propylene polymerization plant. A 150-ton bubble tower was moved 97 feet six inches in an erect position without removing bubble caps or trays. The vessel is a 40-tray tower six feet six inches in diameter by 109 feet 10¼ inches in height.

During World War II Sun operated a butadiene plant at Toledo for the government but at the close of the war the unit was declared surplus and its component parts sold to various buyers. Sun was the successful bidder on the fractionating tower.

In its present extensive building program at Toledo, Sun is building a 4,000-barrel propylene polymerization plant to process C_3 fractions from the gas recovery plant. It was determined to use the former butadiene tower as a depropanizer to separate propane from the polymer after catalytic processing. To do this it was necessary to rotate the vessel and transport it to the new unit's location.

Manfred Holmgren, general superintendent for Catalytic Construction Co., contractors on the job, decided that the tower could be moved without removing internal parts and lowering the vessel to a horizontal position, always a costly and time-consuming procedure. So, under the supervision of the company's chief rigger, James Melton, the tower was jacked up, turned on its axis and moved 100 feet in four days.

Four 50-ton jacks were used to raise the tower from its former footing. Before applying the jacks four 18-inch by 10-foot beams were stitch-welded to the tower 30-inches from the base and 90 degrees apart in a vertical position. These jacking beams were a precautionary measure because of the lightness of the metal in the skirt.

The tower then was raised three feet. Two plates of ¾-inch thickness, three feet wide and six feet long, were inserted under the base of the tower with grease between the plates and with a pin welded to the center of the bottom plate protruding through the upper plate to act as a guide. The tower was then set down on the plates and turned 90 degrees so that the orientation was correct before the tower was moved to the new location.

After orientation the tower was jacked up again and the roadway installed. The 12 x 12-inch timbers made the bed and ten railroad rails were spiked on these. Two 12-inch beams were welded inside the skirt of the tower to distribute the bearing equally.

Four inch still tubes filled with concrete were used as rollers, installed on approximately six-inch centers between the rails and the base plate of the tower. The tower was then started on its 97-foot six-inch journey.

Two sets of triple blocks were used to move the tower, one set on the north side to move it and the set on the south side to hold it back. A winch truck was used for power. Eight one-inch guy lines were set on the four points of the compass. Forward guy lines were shortened and rear lines extended as the tower rolled toward its new location.

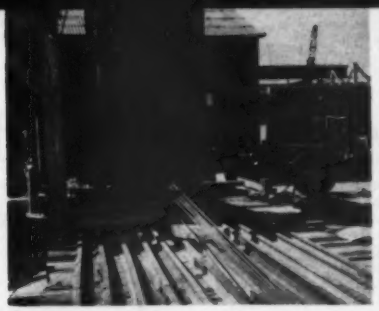
Once the tower was underway it took four days to complete its passage to the propylene polyformer plant. The preparation and planning, plus the operation itself, consumed two weeks.

Mr. Melton apologized to Alan T. Knight, Catalytic's vice president in charge of construction, and to Charles J. Linck, field superintendent.

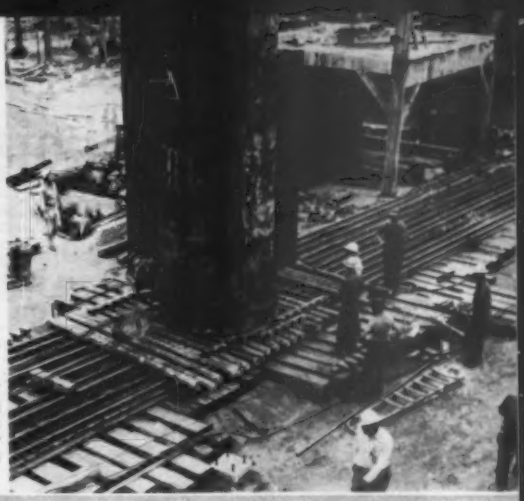
"Those guy lines slowed me up," Melton said.

"Didn't you need them, Jim?" Knight asked.

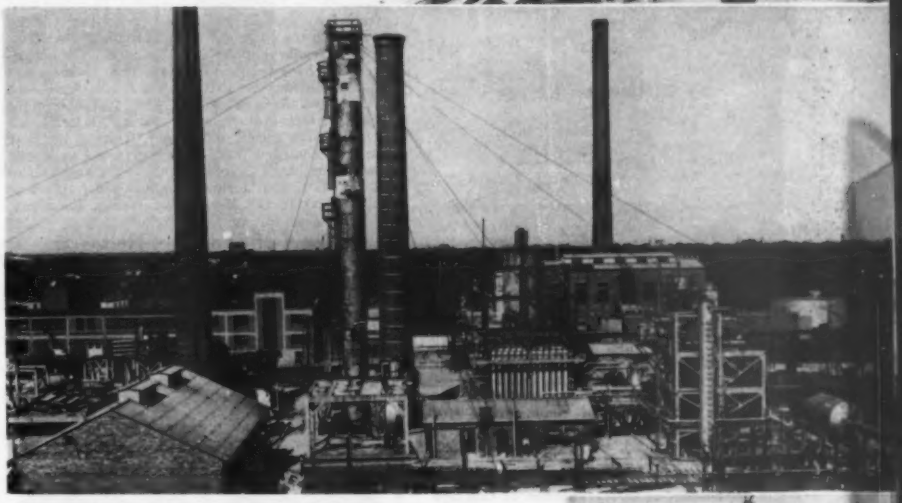
"Naw," Jim said, "but those engineers looked so nervous that I put them on to avert some nervous breakdowns."



▲ Fractionating tower begins its journey. Winch truck supplying power is at the right.



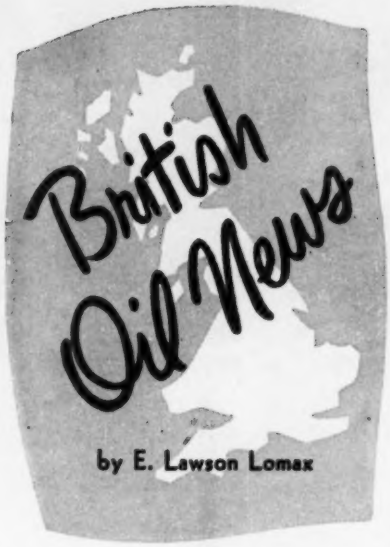
▶ Enroute. Concrete-filled still tubes are spaced about six inches apart by wooden guides. Buckets filled with sand hanging near base of tower were used as plumb-bobs to check on vertical position.



▲ General view of area through which tower was moved. Position of guy lines may be seen.

▶ Tower is safely in place at its new location in the propylene polymerization plant.

Close-up of tower base at new location. One of the jacks used to lift the tower is shown in the foreground. All photos courtesy Catalytic Construction Co.



LONDON

At the end of the first full week of September the Iranian deadlock appears to have taken on the form of an endurance contest. On the one hand the Mossadeq government threatens expulsion of remaining oil company employees unless the British resume discussions on Iran's own terms. On the other hand, the British government, holding that negotiations have been broken off by Iran's actions, has decided to end the financial privileges heretofore accorded. This means that the drawing of funds which Iran was permitted to make while talks were continuing will be stopped, that conversion of sterling into dollars will end, and that trade with the Persians will be subject to security licensing. While predictions as to the outcome of this new phase are withheld, there appear to be signs of opposition in Iran to the Mossadeq policy of rule or ruin. An indication of the difficulties which the Persians may encounter if they try to operate the oil industry by themselves was afforded last month when the last of the British workers left the southern fields for Abadan. Directly after the evacuation took place an appeal came from the Persian technical staff for assistance to repair breakdowns.

Exports of British Equipment

The Council of British Manufacturers of Petroleum Equipment has published figures giving the value of orders placed for materials and equipment for export from the United Kingdom for the first six months of 1951. These statistics show a total of nearly £28,000,000 and reveal also that the value of export orders for the second quarter of this period was over £3,000,000 higher than during the first three months. The council also published a list of future activities which included an annual general meeting and luncheon, an "overseas" luncheon organized by the Overseas Advisory Committee, visits to refineries and to the works of manufacturing firms supplying plant and materials for the petroleum industry.

The Diesel Story

A film called the "Diesel Story" has been produced by the Shell Film Unit. It covers the progress of the diesel engine from the early experiments of Dr. Diesel to the present day. Shots are shown of a single cylinder engine similar in design to the first satisfactory engine built at Augsburg in 1897, and one of the largest diesel engines in the world, 22,000-hp, for generating electricity in Copenhagen.

Mechanical Seals at Sea

The 24 T2 ocean-going tankers operated by the Esso Transportation Co. Ltd., are to have their cargo pumps fitted with Flexibox Mechanical Seals. In addition, the "Esso" 26,500-ton tankers, now under construction, are to be similarly equipped, it is announced by Flexibox Ltd., Manchester. First seals were fitted to crude oil pumps of the S. S. "Esso Birmingham" in August, 1950.

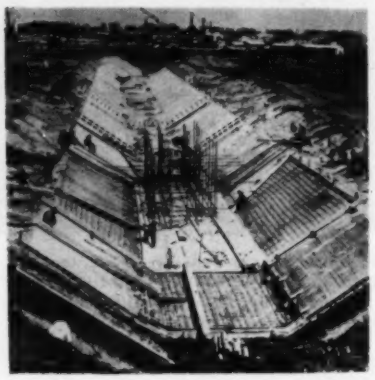
"Esso" T2 tankers are fitted with centrifugal pumps which handle crude oil and salt water alternatively. The pumps are horizontally split with stuffing boxes at either side operating at 1,750 rpm at temperatures up to 140° F. Delivery pressure of the pumps can be as high as 125 psig.

Information Bureau Organized

Leading oil companies in Australia have organized the Petroleum Information Bureau (Australia) to provide information regarding the industry in the commonwealth to newspapers, magazines, radio stations and others. Temporary quarters have been taken at 460 Punt Road, South Yarra, Melbourne.

Head of the new bureau is M. T. Lloyd, managing director of Commonwealth Oil Refineries prior to his recent retirement. During the war he was chairman and managing director of the petroleum pool. Executive officer of the bureau is A. W. Colley, formerly deputy chief information officer to the Ministry of Works, London.

Fears of Shortages Relieved



Work under way on 4,000 foot concrete channel which will supply sea water for cooling purposes at AIOC's new Isle of Grain refinery.

The fears of a serious shortage and possible rationing of petroleum products have been greatly relieved by the friendly assistance given by the American oil industry, the increase in production by other Middle East fields and the stepping up of throughputs by various refineries. The Anglo-Iranian Oil Company has announced that production by their Llandarcy refinery has been raised to a rate of four million tons per year. To accomplish this, two old cracking plants have been revamped to serve as primary distillation units. The company also has made known that its new refinery on the Isle of Grain is in an advanced state of preparation and is expected to go into production by the end of next year. The output of Shell refineries also has been increased.

Anglo-Iranian Films

"Oil for the 20th Century" is the title of a film giving a complete history of the development of the Anglo-Iranian Oil Co. from the time of the granting of the first concession in 1901 to William D'Arcy, through the early exploration period under C. B. Reynolds down to the present time, when, after the building of the world's largest refinery in Abadan, the whole project has had to be closed down for a period which it is hoped will be only temporary.

Seismic Recording Instruments

Oil technicians in the U.K. and Holland are collaborating with British manufacturers to make the expensive recording instruments used in seismic surveys. Some 14 sets of these instruments, formerly exclusively manufactured in the U.S.A., will have been completed soon.

Llandarcy Steps Up Production

The Persian oil crisis has lent a sense of urgency to the expansion of refineries in the United Kingdom. This is very evident at the Anglo-Iranian Oil Company's Llandarcy plant, South Wales, where production has now been pushed up to the rate of 4,000,000 tons a year, ten times its pre-war capacity.

In the drive to step up production, two obsolete "crackers" (for the production of petrol from heavier oils) due for scrapping, have been once more pressed into service as distillation units. These supplement the new distillation unit completed in September 1949 as part of the expansion program which ranks among the largest in Europe. It processes 2,000,000 tons of crude oil a year.

To make way for a new line of lubricating oil units which will more than double the present output of 50,000 tons a year and for a plant for raising the octane number of motor spirit, 25o,-000 cubic yards of rock and earth were shifted.

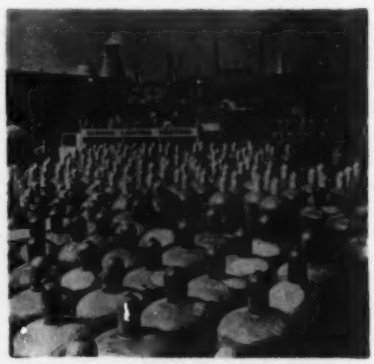
On completion of the refinery extension there will be about 500 miles of pipe line arranged in "routes" up to 60 feet wide. Several miles of new roads and railway lines are being built over the 800-acre site, and a 4,000-foot long sewer, to carry cleansed water, is being laid to the River Neath. At every stage of the expansion scheme consideration is given to the overriding need for keeping the existing plant running without interruption while the development is carried on.

The great increase at Llandarcy has made Swansea a very busy port, for by far the largest part of its traffic consists of tankers bringing crude oil to the refinery from the Middle East. Queen's Dock now accommodates ships laden with up to 17,000 tons of oil and 28,000-ton supertankers, now under construction, will before long be sailing into the dock when the tides are right.

An unexpected snag cropped up at Queen's Dock towards the end of the last war when wooden jetties, some of which had been handling cargoes for 20 years, were suddenly attacked by Teredo (or shipworm). This meant that they had to be replaced by concrete ones. Three have been built and the remaining two are in course of construction.

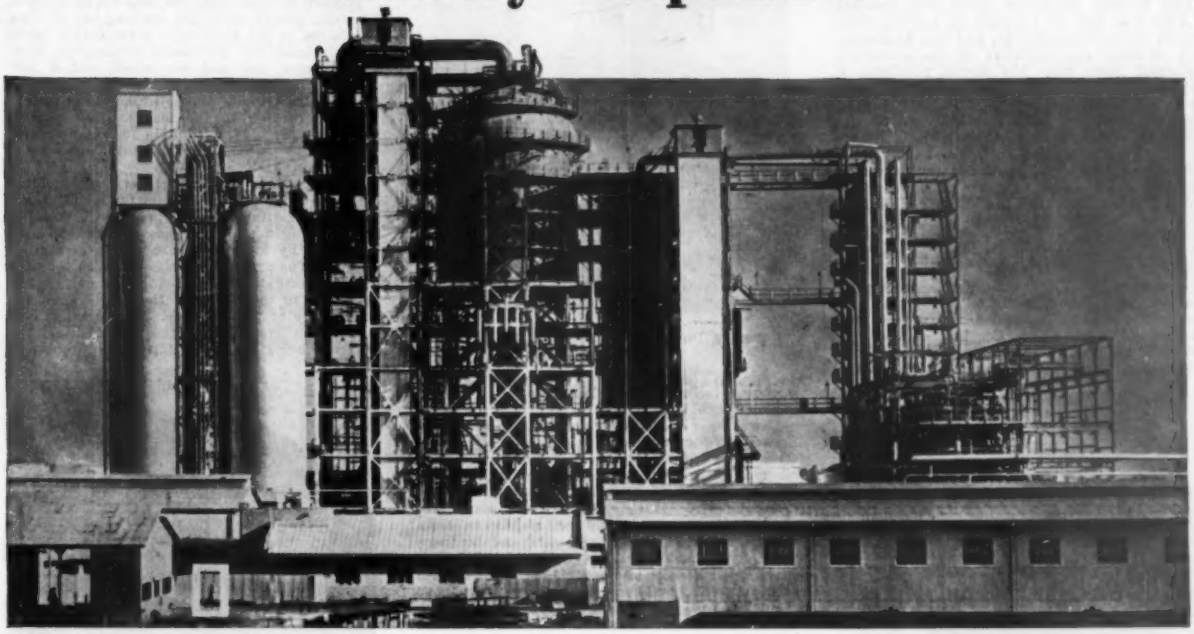
The refinery tank farm to which crude is pumped is being expanded. When completed there will be 90 tanks in the farm capable of holding 200,000,000 gallons.

The Llandarcy plant was originally opened in 1922 by the Rt. Hon. Stanley Baldwin, at that time president of the Board of Trade. It had been planned eight years earlier but war-time shortages of men and material held up its construction until 1919.

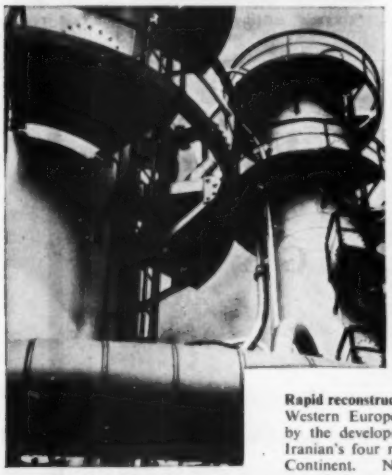


LPGas cylinder dock at the AIOC refinery at Llandarcy. Bottled gas is distributed to remote districts from the refinery.

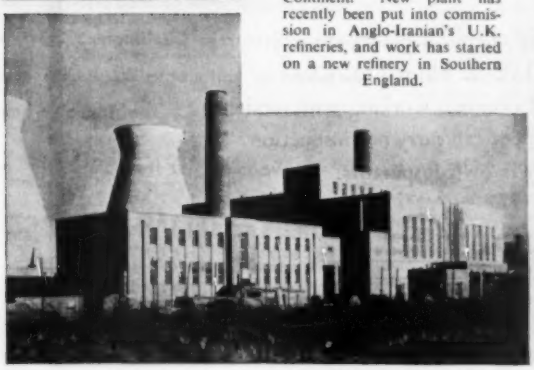
Refinery Expansion



Continued expansion of Anglo-Iranian's many refineries in various countries accounts for steadily increasing throughput and higher quality of finished products. The size of the huge new catalytic cracking plant shown above can be judged from the figure of the man outlined on the lower left.



Rapid reconstruction of post-war Western Europe is exemplified by the development of Anglo-Iranian's four refineries on the Continent. New plant has recently been put into commission in Anglo-Iranian's U.K. refineries, and work has started on a new refinery in Southern England.



OIL PRODUCERS and refiners in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies operate eleven refineries in the United Kingdom, France, Germany, Italy, Israel, Irak, Kuwait and Australia. Their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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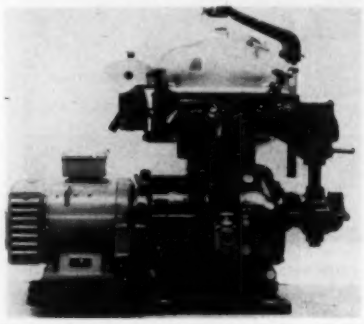
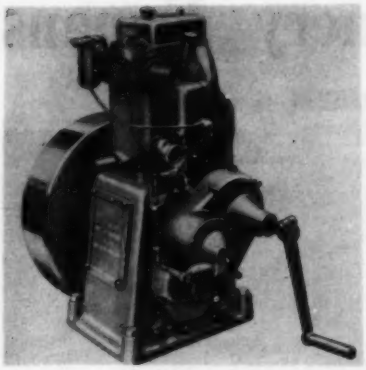
Engineering, Marine and Welding Exhibition

This biennial exhibition which was founded in 1906 was held at Olympia in London from August 30 to September 13, and can be considered as fully representative of the industries concerned, more than 500 stands providing a very wide range of engineering products. Among the many exhibits staged, the following may be cited as being of particular interest to the petroleum industry: Alfa-Laval Co. Ltd., Brentford, Middlesex, showed their De Laval V.I.B. 1929 C Centrifugal oil purifying equipment as fitted in motor vessels for the purification of lubricating oil and high viscosity fuel oils, of viscosities ranging from 1,600 secs. to 3,500 secs. Redwood No. 1 at 100° F., for use as diesel fuels. Equipment of this type has successfully completed five years of service in a motor tankship covering 325,766 sea miles of service with complete satisfaction, with a saving in fuel costs of about £7,500 against ordinary diesel oil.

Coventry Victor Motor Co. Ltd. exhibited a number of their well-known air-cooled and water-cooled diesel and petrol engines for various purposes, including their latest Coventry Diesel engine, the W.D. 3, 9/11 hp.



De Laval V. I. B. 1929 C centrifugal oil purifying equipment.



Coventry Diesel's newest engine, the WD 3 (9/11 hp).

Dewrance and Co. displayed their Dewrance-Consolidated safety relief valve specially constructed to give protection to equipment in the oil refining industry. This valve is suitable for petroleum liquids, gases and vapors, and is used extensively throughout the world on cat crackers, fractionating columns, stabilizers, and scrubbers. The outside bevel seat and floating guide construction eliminates leakage under discharge pipe stresses and assures maximum tightness under all conditions of operation.

Harland and Wolff had many of their products on view, among which one of the most interesting from the petroleum point of view was a Harland & Wolff-Cooper Bessemer combination V-type gas engine and horizontal compressor unit. This compact unit develops 440 bhp at 300 rpm, and is designed to compress various types of petroleum gases. It represents a range of gas engine and motor driven compressors from 150 to 2,750 bhp which are manufactured by Harland and Wolff under license from the Cooper-Bessemer Corp. of Ohio, U.S.A.

Richard Klinger Ltd., the well-known packing material makers, were also showing two of their specialties in the form of a sleeve-packed brass cock designed for instrument connections, pressure gauges, gas and air reliefs and a new Klinger valve primarily designed for instrument work, which permits controlled flow to an extent which, according to the makers, has hitherto been unknown. It is suitable for oil pressures up to 5,000 psi and for use with superheated steam up to 2,000 psi.

Rockweld Ltd., manufacturers of welding equipment, had on view a plant for the "Oxyarc" process of cutting. In this process the metal is cut by using a fine point concentration of heat, generated by an electric arc and a stream of oxygen. The arc is established between a coated tubular electrode and the metal to be cut, oxygen being fed to the center of the arc through the hollow core of the electrode. The metal is severed by an oxidation reaction and melting, the electrode being consumed during the process of cutting.

"Oxyarc" cutting heavy section of cast-iron water main.

MILLENNIUM-KEY

PETROLEUM FITTINGS

MILLENNIUM KEY

Cast Steel Fittings for oil refinery and chemical plants are manufactured throughout at Braintree by Lake & Elliot Ltd. Close metallurgical control is maintained by competent chemists working with modern apparatus. The independent inspection department can carry out inspection, or work in conjunction with customers own inspectors.

Lake & Elliot Ltd.

BRAINTREE ENGLAND

Sharples Centrifuges Ltd. showed the development of their "One Pass" bowl for the dehydration and clarification of heavy boiler oil for use as diesel fuel. It is claimed that this plant, using a modified tubular type of bowl, will carry out the same work as the dual types of machines using disc bowls.

Stewarts and Lloyds Ltd. exhibited a selected range of products, among which for the first time at a public exhibition S & L electric resistance weld boiler tubes (manufactured to B.S. 1654) were shown. Tubes made by this process are said to be in all respects equal to, and in some respects, superior to seamless tubes, and have been approved by Lloyd's Register of Shipping and the Ministry of Transport for use in both smoke and water tube boilers, the fine finish of the tubes making them particularly suitable for this use.

G. and J. Weir Ltd. had an interesting exhibit in which the boiler feed pumps taken from the "Aquitania" formed a conspicuous part. They were installed in the vessel when she was built and are still in excellent condition after 40 years of service, during which the Aquitania steamed about 3,000,000 miles. A pair of modern Weir direct-acting pumps was also displayed, and a turbine-driven pump of the same capacity as the Aquitania's pumps provided an interesting comparison in size and weight.

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A weekly report giving oil well drilling and production information on the following countries:

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Fawley Refinery Opening

A great source of confidence is the formal opening of the Fawley refinery of Esso Petroleum Co., near Southampton, at which Prime Minister Atlee officiated in impressive ceremonies on September 14. This great plant, the largest in Europe, will have a throughput of 130,000 barrels when in full operation. A visual evidence of its size is afforded by the great array of tanks providing storage for approximately four million barrels. More than half of this capacity was supplied by Whessoe Ltd. of Darlington under a major equipment contract. The largest of these tanks have a capacity of 150,000 barrels each. Twenty of these tanks are equipped with Horton pontoon floating roofs with pantagraph hangers made by Whessoe,, who have been one of the British licensees of the Chicago Bridge & Iron Co. for more than 20 years. The company has further contracts for additional storage at Fawley in connection with additional units under construction.

A Glossary of Petroleum Terms

For some time the Nomenclature Sub-Committee of the Standardization Committee of the Institute of Petroleum has been preparing a glossary of petroleum terms, the proviso being that the definitions should be in such language that those not versed in the technicalities of petroleum could gain some benefit from it. The sub-committee is still working on the glossary, but as an interim measure has issued the first part of its work in booklet form. This booklet of 16 pages deals with the more widely-known petroleum products and terms used in the industry and gives definitions of 117 items. Copies may be obtained from the Institute of Petroleum, 26, Portland Place, London, W 1, price 1s3d by post.

Company Reports

Several additional company reports have been issued since last month.

Tankers Ltd. reports a very successful year's trading during 1950. Profits for the year are more than £55,000 up on 1949 and dividends on both the ordinary and participating preference shares have been increased by five percent.

Ultramar Co. Ltd. report shows that the financial position is much stronger at the end of 1950 than it was at the end of 1949. Ultramar is a holding company whose main assets consist of 100 percent holding in Caracas Petroleum S.A., together with advances to that company. CPSA owns 50 percent of the capital of the Mercedes Co. and has made advances to that company. CPSA has also certain concessions of its own in Venezuela and interests in certain royalty companies. The income of the Mercedes Co. has risen from $13,000,000 in 1949 to $19,500,000 in 1950, and after deducting operating charges there is a net profit of $313,000 against a net loss of $213,000 in 1949. During the year £900,000 plus interest of the loan from the Finance Corp. for Industry was paid off, and in August 1951 a further sum of £350,000 plus accrued interest has been paid, leaving a balance of £750,000 plus accrued interest, which it is hoped to discharge by the due date Sept. 30, 1952.

Fifty-six development and exploration wells have been drilled, of which 38 were producers. 6,796,320 barrels of oil were produced during 1950, being a daily average of 18,620 barrels, while the average per well day has been maintained.

C. C. Wakefield and Co. report that arrangements have been made for an increase in the capital of this company, which manufactures the well-known brand of Castrol lubricants, by the issue of 227,500 ordinary 10/- shares as "rights" to ordinary shareholders at £2-10-0 each, in addition to £1,250,000 of 4¼ percent first mortgage debenture stock 1961-81. The new finance is required to cover expansion in trade at home and abroad, increase in value of stocks it is necessary to carry, increased expenditure over estimates for the new works at Stanlow, extensions at the Hayes works and expenditure on other buildings.

Stanlow To Manufacture Sulfur

The company is installing a sulfur recovery plant which will recover 10,000 tons of sulfur from hydrogen sulfide separated from the cracked gases produced in the cracking of products from Middle East crude in the catalytic cracking plant which is scheduled to come into operation at the end of this year. In addition, an acid plant is being installed to convert waste acid sludge to fresh acid. This acid plant is designed to take in 5,000 tons of Shell's own produced sulfur in addition to the sludge acid, the resultant acid being sufficient for the refinery's requirements. So long, however, as elemental sulfur is in short supply in the country, this sulfur can be released to domestic consumers, and sulfuric acid obtained from outside sources which use less critical material for its manufacture than elemental sulfur. The cost of these plants is estimated to be between £500,000 and £600,000 and they will commence operation in 1952.

Just Published!

INDUSTRIAL PIPING

By Charles T. Littleton

Formerly Engineer in Charge of Piping, American Cyanamid Company

394 pages, illustrated, $8.00

Here is a thorough, practical guide to piping principles, methods and data to aid in the effective design and use of pipe, pipe fittings and materials for industrial purposes. It includes a vast compilation of facts on materials and types of piping required in the chemical, process, and petroleum industries and power plants . . . all the standards, practices and data to replace the many handbooks, catalogues, and specifications required by practicing piping men. The simplest, most useful methods for solving such problems as determining pipe sizes and pressure drops, etc. are plainly described. For each service —water, gas, steam, etc. you'll find material covering methods of flow calculations as well as the material, fittings, and valves used for that specific service. The chapter on estimating piping costs includes an ingenious quick method of computing variations in costs.

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IGNEOUS AND METAMORPHIC PETROLOGY

Just Out

by Francis J. Turner and Jean Verhoogen

Both of the Department of Geological Sciences, University of California, Berkeley, California

602 pages, 92 illustrations, $9.00

IN this extensive and advanced treatise, two petrologists bring you a unified discussion of the origin and evolution of igneous and metamorphic rocks. They treat the phenomena of these two classes of rocks as partially dependent on one another, and interpret them against the same physico-chemical background. Considerable space is devoted to the concepts of equilibrium and stability, to the kinetics of chemical reaction, and allied topics in the realm of physical chemistry.

Look up these special topics:

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International news and notes

De Mares Holdings Returned to Colombia

On August 26 at Barrancabermeja, Colombia, the representative of the Tropical Oil Co. returned to the Colombian nation the De Mares concession and all its properties in a ceremony marked by mutual expressions of good will. The concession, which expired on that date, had been under private operation for 30 years.

Addressing Dr. Manuel Carvajal, Minister of Fomento of Colombia, L. P. Maier, president of International Petroleum Co., acting for Tropical, said: "So far as I know this is the first time in the history of the petroleum industry that an important property developed by private capital under a concession granted by a nation has been returned to the nation by virtue of expiration of the contract. The reversion of De Mares has occurred in accordance with terms agreed upon many years ago between the government and men from abroad who committed their capital and effort to a difficult task. This occasion demonstrates that understanding and good will have succeeded in producing mutual benefits for the nation and the company. In Colombia, as in other countries which have oil deposits, the petroleum industry has been a principal factor in raising the standard of living and promoting social and economic improvement of the entire nation."

While a government sponsored company, Empresa Colombiana de Petroleos, takes over the operation of the De Mares properties, a new privately owned company, International Petroleum (Colombia) Ltd., will supply technical advice and assistance in the operation of the refinery, will advance a loan of $10,000,000 for the enlargement of the plant and will continue exploration and development of other holdings in Colombia.

British Columbia Activity

Oil and gas showings have been found in the northern part of British Columbia in a well being drilled by Pacific Petroleum near Fort St. John. Peace River Allied Fort St. John No. 1, about five miles from the town, had a strong showing of oil at 2,700 feet and a gas flow of 403,000 feet. Well has now passed the 3,700 foot level. It hit the Triassic about 500 feet earlier than expected. The structure is considered the most promising ever hit in B. C. Since discovery of oil showing in this area, value of land on the B. C. side of the B. C.-Alberta border has increased.

About 28 miles south and east of Fort St. John another well, Pacific ACT Kiskatinaw, is now beyond 4,500 feet. Farther north Phillips Petroleum has passed 10,000 feet in a deep well test but findings have not been reported. Previously Phillips drilled a dry hole near Dawson Creek.

Drilling rigs are moving into the Flathead area in the southeast corner of B. C. and in the Monkman Pass district near the Alberta border. Dr. T. B. Williams, head of B. C.'s Natural Gas and Petroleum Board, says that nine large gas seepages have been found in this area.

Findings of this last summer have renewed interest in B. C. to the extent that land is getting scarce as the search is pushed and close to 12,000,000 acres are now either applied for or under permit. Drilling in the Queen Charlotte Island area has been abandoned as has the well near Vancouver at Surrey. Searchers are concentrating in the Peace River and Flathead areas.

An attempt to discover oil on the West Coast of Vancouver Island was indicated with the application of ACT Oils Ltd. for a permit on 19,859 acres around Hesquiat Harbor near Nootka Sound.

Burmah Oil Company Expands Chauk Refinery to Meet Local Needs

The Burmah Oil Company Ltd., is erecting a two-stage distillation unit at its Chauk refinery located 400 miles north of Rangoon. When the new unit is completed in 1952 it will supplement the existing plant at Chauk where Burmah Oil has concentrated its post-war producing and refining operations.

The indigenous oil industry in Burma today is limited by the country's internal situation to producing and refining on a small scale, the pre-war BOC pipe line being inaccessible and the rebuilding of the war-damaged ocean refinery at Syriam, near Rangoon, accordingly being at present out of the question.

Before the war BOC operated a 327-mile, 10-inch crude line from the fields to the Syriam refinery and at the close of the war it was planned to put this back into service, but subsequent developments made this impossible.

The restoration of secure road, rail and river communications in many areas of the country awaits the return of settled conditions. Much improvement has taken place during the past year but major oil shipments are still chiefly dependent on convoys up and down the Irrawaddy River.

About 40 percent of the country's requirements of motor spirits, kerosines, diesel oils and fuel oil is now being met from local production and refining, the remainder of the country's needs being supplied by imports.

The output of the existing refinery at the Chauk oil field averages about 1,500 barrels a day, more as craft for moving the products become available. Most goes to markets in central and upper Burma. Every drop which can be delivered to markets under present conditions is being refined now.

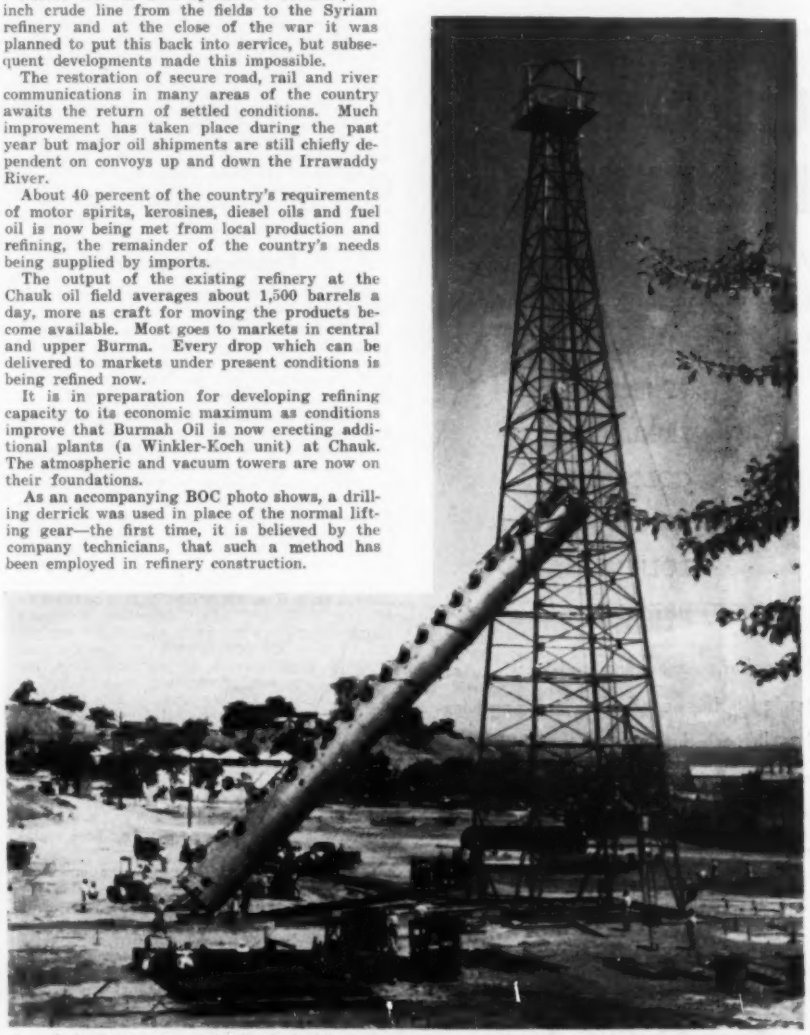
It is in preparation for developing refining capacity to its economic maximum as conditions improve that Burmah Oil is now erecting additional plants (a Winkler-Koch unit) at Chauk. The atmospheric and vacuum towers are now on their foundations.

As an accompanying BOC photo shows, a drilling derrick was used in place of the normal lifting gear—the first time, it is believed by the company technicians, that such a method has been employed in refinery construction.

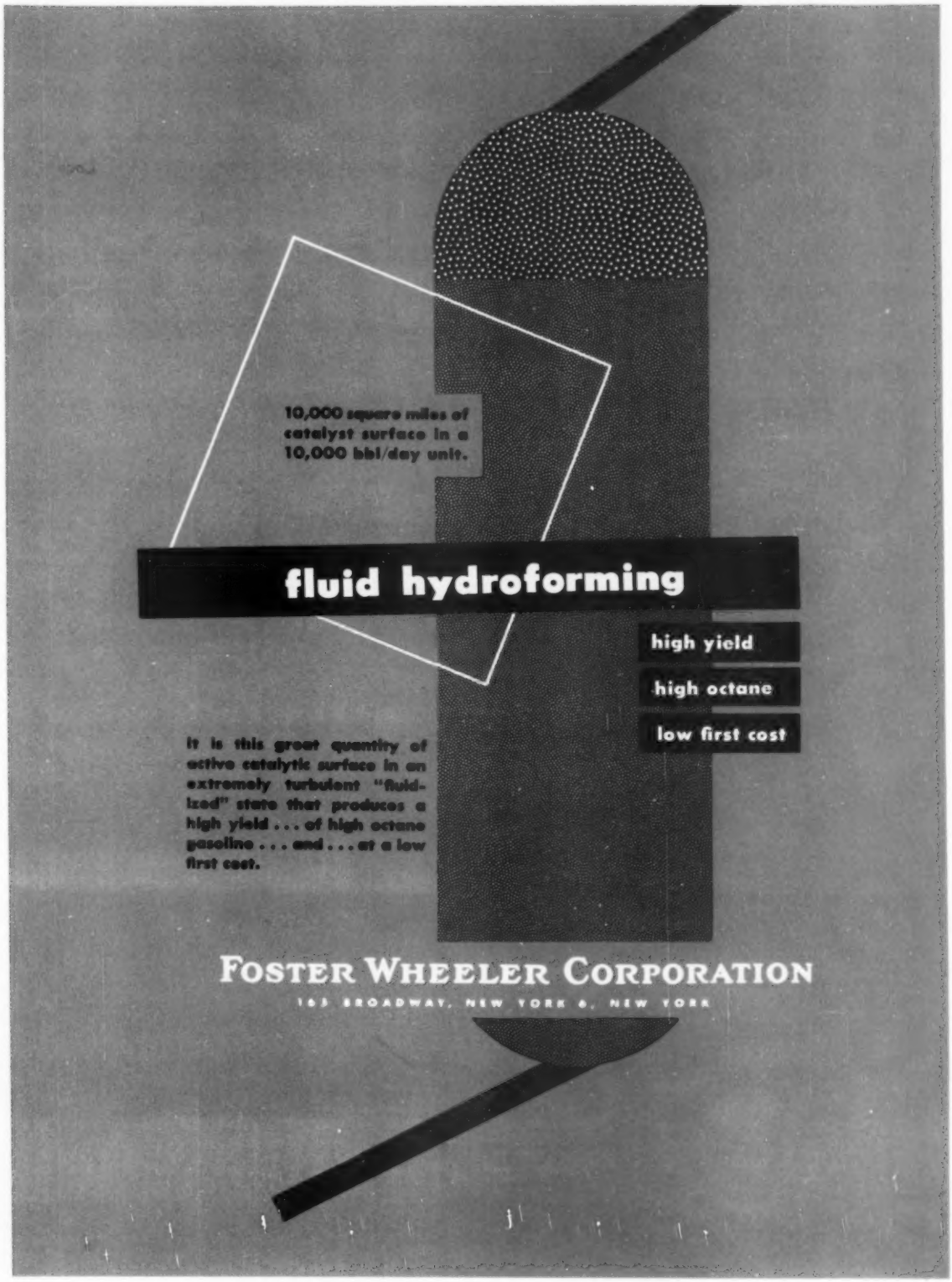
Tractors hauled the 92-foot column to its appointed site in the refinery area, where a 136-foot oil derrick, specially braced to take the tower's whole weight, had been erected.

For the lifting operation steel ropes from a D8 tractor were run over the crown block of the derrick and attached to the top end of the tower, then lying on the ground. Slowly the tower was hauled up inside the derrick, the bottom end sliding along a carriage-way of greased planks.

The actual raising was completed within one hour. The derrick also was used later for raising the vacuum tower, following which it was dismantled.



An oil derrick was used by Burmah Oil Co. engineers to raise the atmospheric tower for the refinery expansion in the central Burma oil fields. The tower was raised to an upright position wholly within the framework of the derrick and then bolted down onto its new foundations. The derrick was later removed to a new position for the raising of the vacuum tower.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high octane
low first cost
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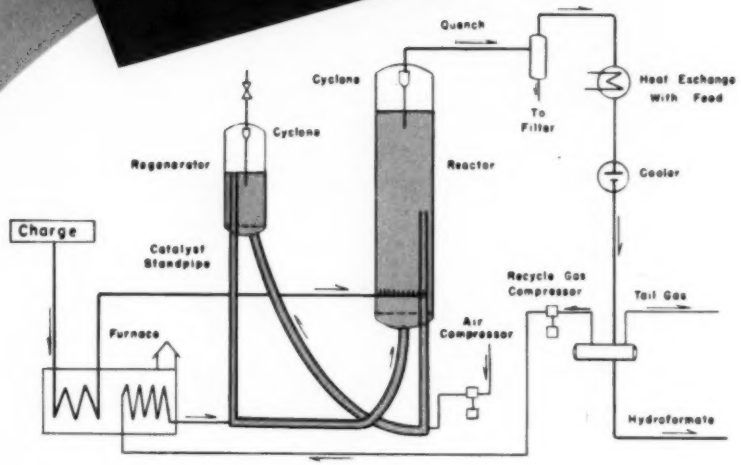
fluid hydroforming



The "fluid" principle, as applied to hydroforming, provides all the distinct advantages of full, continuous operation. Its inherent process variables also makes possible a more exact control of the intensity of the hydroforming reaction.

Foster Wheeler's Fluid Hydroforming Pilot Plant is available for stock evaluation and determination of process design data.

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Reviews Pemex Activities

Mexico has mapped out 100 geological structures for early drilling, Mexican President Miguel Aleman reported in his annual "state of the union" address to Congress. Last year Pemex drilled 267 wells, of which 145 were successful. Four new fields were discovered during the year. Reserves increased to 1,387 million barrels.

Production currently is 225,000 b/d which is sufficient to meet the nation's needs and provide a surplus for export, the President said. Total output for the year was 64 million barrels of which 57 million barrels was refined in Mexican plants. Exports are now about 63,500 b/d.

The following projects were reported to have been completed:

The Trans-Isthmus pipe line, the 4,000 b/d Reynosa refinery, the Mision-Reynosa-Brazil-Maramoros gas line, the Monterrey-Cementos-Hidalgo gas line, the pipe line connecting the Monterrey and Francisco Cano field with the Reynosa refinery, the pipe line linking the new Rabon Grande field with the Nanchital terminal, a new 18,000-kilowatt electric plant at Poza Rica, enlargement of the absorption plant there, a gas-compression plant to repressure wells in the same field, a gas-purification plant for distribution of commercial gas to the industrialized Valley of Mexico and a sulfur plant, the last two also at Poza Rica.

The President cited the folowing as under way but not yet terminated:

New sulfur plants at the Madero and 18th of March refineries, a lube plant at the Salamanca refinery, a gas line from Monterrey to Torreon, a pipe line system to distribute refined products from Salamanca, the new pipe line being laid from the Jose Colomo field to the El Plan field and the Puerto Mexico refinery, a gas line to connect the Xicalango gas field with Ciudad del Carmen, in the State of Campeche. Before the end of the year, it was added, construction will be started on Veracruz shipyards designed to build tankers up to 14,000 tons. This shipyard will be operated by the Italian Fiat Automobile Co.

New Oil Fields in Bahia

The President of the National Petroleum Council, Brazil, on his return from Bahia, confirmed the discovery of an important oil well at Pedras, in the municipality of Entre Rios, northeast of Salvador. Initial production is estimated at 300 barrels daily, at an approximate depth of 300 meters. The oil is of excellent quality, light and paraffinic. Arrangements are being made for further drilling. The new well is 48 miles from the Candeias field and 120 miles from Salvador. Other oil-bearing areas will probably be found between Candeias and Pedras. Local conditions are not very favorable for work and transportation, owing to the swampy nature of the ground.

General Barreto also visited two other recently discovered oil fields in Bahia, at Catu (WORLD PETROLEUM, March 1951) and Paramirim. The former lies midway between Candeias and Pedras. The first producing well there, 1,300 meters deep, yields 700 barrels of excellent oil daily. In the Paramirim field, discovered at the end of last year, between Candeias and D. Joao, one of the three wells drilled to date has a potential output of 500 barrels daily, at a depth of 1,300 meters. Drilling is proceeding in both districts and has reached 500 meters at Catu and 800 at Paramirim.

Referring to the D. Joao field, General Barreto said there are now 40 producing wells, with an average depth of 800 meters and a potential daily yield of 250 barrels each of fine oil, rich in light products. Drilling is continuing normally at Candeias, where the oil has a higher paraffin content and is rich in lubricants. Gas will be conveyed in pipes from the Aratu field to permit repressuring in some of the wells, so as to facilitate extraction.

Build National Treaters in Canada

Dominion Bridge Co. has obtained rights to manufacture National Tank Co. oil treaters in the Edmonton plant of The Standard Iron and Engineering Works, Ltd. More than 60 treaters of various sizes have already been fabricated or are in the course of manufacture.

Plan Detergent Plant in Israel

Israel Government has projected the establishment of a $2,500,000 polymerization and alkylation plant for the production of detergents. Raw material for the proposed plant would be supplied by the Haifa refinery in the form of propylene. The plant would be designed for an annual output of 3,000 to 3,500 tons of detergents, two-thirds of which would be required to meet domestic needs and the rest to be available for export. The Israel Government hopes that private foreign investors will participate in this scheme.

Aids Offshore Test

Cities Service has invested $40,000 dry-hole money in the test being drilled by Lasso Brothers for Petroleos Mexicanos in the Tamiahua Lagoon off Tampico. The company is believed to have an agreement pending with Pemex for additional exploration work in this zone. U. S. observers here attributed the company's dry-hole commitment and general interest in the off-shore test to the pending agreement. The test, located a kilometer north of El Toro Island and nine kilometers east of the famous "Dos Bocas" well site, will be drilled from a platform. Crews are already rigging up on the platform and spudding-in is expected in the near future.

Second Colomo Well Completed

Petroleos Mexicanos has completed Jose Colomo No. 2, a 400-foot offset to the recent discovery near Mascupana, in the State of Tabasco and on the Isthmus of Tehuantepec. The new well came in wild but was later brought under control. While production tests have not yet been run, the indications are the new well is at least as good as the discovery well. The first well was brought in April 18 as a 1,900-barrel producer. About 600 feet of saturated sand was penetrated giving rise to high estimates of probable field reserves. The oil is sweet and of unusually high gravity.

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Colombia Refinery Expansion

Foster Wheeler Corp. has been given the contract to enlarge and modernize the Barranca-Bermeja refinery which reverted to the government on August 25. The project will cost $24 million when completed in 1953. It is to be operated by International Petroleum Colombiana, Ltd., under a contract with Empresa Colombiana de Petroleos.

The new construction is planned to meet the nation's oil requirements up to 1960 when it is anticipated that Colombian consumption will have risen to 15 million barrels. Current consumption is about 8.3 million barrels per year but the rate is rising rapidly.

Involved in the project is a new topping unit with a capacity of about 38,000 b/d, a fluid cat cracker with 15,000 b/d capacity, a 16,500 b/d vis breaker, 1,200 b/d alkylation unit together with a treating unit, utilities, tankage, packaging plant, shops and warehouses.

New Canadian Discovery

British American and Cities Service have discovered what appears to be a new oil field on a 1,000-acre block near Clive, Alberta, about 30 miles northeast of Red Deer. The well found the top of the D-2 at 6,190 feet and the first D-2 porosity at 6,227 feet. A 15-minute formation test at 6,227 to 6,231 feet showed 50 barrels per hour of 38.8 gravity oil with no water. Plans are to carry the well to the D-3 before completing.

Saskatchewan Discovery

A new oil strike near Dahinda, Saskatchewan, about 55 miles southwest of Regina, has been made in the Shell Oil Company's Dahinda No. 1 about 12 miles north of Omega. The oil was found near the top of the Charles-Member limestone formation in a 10 foot section topped at 4,594. The oil is lighter than at Lloydminster, the only commercially producing field in Saskatchewan.

Middle East Production

Crude production in the Middle East averaged 1,893,600 barrels daily in July as compared with 2,232,100 b/d in June. The drop of 522,000 b/d in Iranian output was partially compensated for by very large increases in Kuwait and Saudi Arabia. Average for the region was off 248,500 b/d. Details by countries for the months of May, June and July follow:

(Thousands of Barrels Daily)

Country	May	June	July
Iran	719.0	638.0	116.0
Saudi Arabia	739.8	758.7	820.0
Kuwait	491.4	528.5	650.0
Iraq	173.0	171.0	173.0
Qatar	50.1	58.0	58.0
Egypt	44.2	47.1	45.8
Bahrein	30.0	30.0	30.0
Turkey	0.8	0.8	0.8
Total	2,248.3	2,232.1	1,893.6

Gulf Wildcat in Canada

Gulf Oil Corp. has reported a discovery approximately eight miles south of producing fields at Stettler in Alberta, Canada, which gives indication of initiating a major development.

Production was obtained at 5,175 to 5,211 feet in the B-2 zone of Devonian formation. On drill stem test for 30 minutes gas came in after five minutes and oil after 25 minutes. Preliminary estimates of the well's production were set at 1,700 barrels per day from 36 feet of pay thus far penetrated. The oil is 30° gravity at 60°F. Drilling to determine if oil is present at lower depths is continuing. It is expected that the D-3 zone of Devonian will also be productive.

Through its subsidiary, Canadian Gulf Oil Co., Gulf currently has 16 producers in the Stettler Field and four in the Big Valley area. Gulf's holdings in Alberta are approximately 4,280,000 acres. In Saskatchewan it has 890,000 acres and in Manitoba 362,000 acres. In addition it is a one-quarter holder of 3,100,000 acres in British Columbia.

Cima Ownership Announced

Petrofina, the Belgian oil company, does not own 57 percent of the stock of the Mexican-American Oil Co., pioneer foreign company to drill in Mexico under a percentage-of-production contract, it was officially announced by Cima, as the company is known in Mexico. According to Cima, the stock is divided as follows: American Independent Oil Co. de Mexico, 43⅓ percent, Petrofina, 43⅓ percent, and Edwin W. Pauley, 13⅓ percent. American sources in Mexico say that Pauley recently disposed of part of his stock to unnamed holders.

Oppose Refinery Expansion

Burnably Municipality opposition may make it impossible for Standard Oil of B. C. to acquire property in the district needed for future expansion of the firm's refinery, Stanovan. The company has offered the municipality a reported $75,000 for purchase of 70 acres of municipally-owned land alongside its present site. Councillors have opposed the deal on the ground that it may bar access to the waterfront.

Study Digboi Field

Keplinger and Wanenmacher, petroleum engineers, Tulsa, Okla., has been given an assignment to study reservoir and operating problems of the Digboi field in India for the Burmah Oil Co. Ltd. Henry Keplinger is enroute to the field, which is located northeast of Calcutta near the China-Burma border. He will visit London, Egypt, Bahrein Island and Karachi on the trip.

Colombian Products Line

Williams Brothers is proceeding with construction of the 8,850 b/d products line from Pto. Salgar to Bogota which will assist in delivering products to the capital city by relieving other forms of transport. The $3,500,000 line will revert to the Colombian government at the expiration of a 30-year concession.

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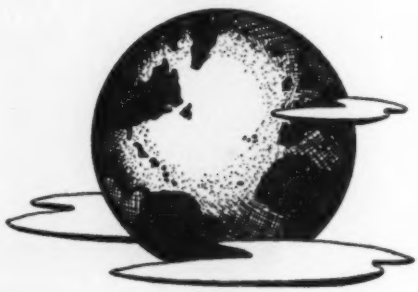

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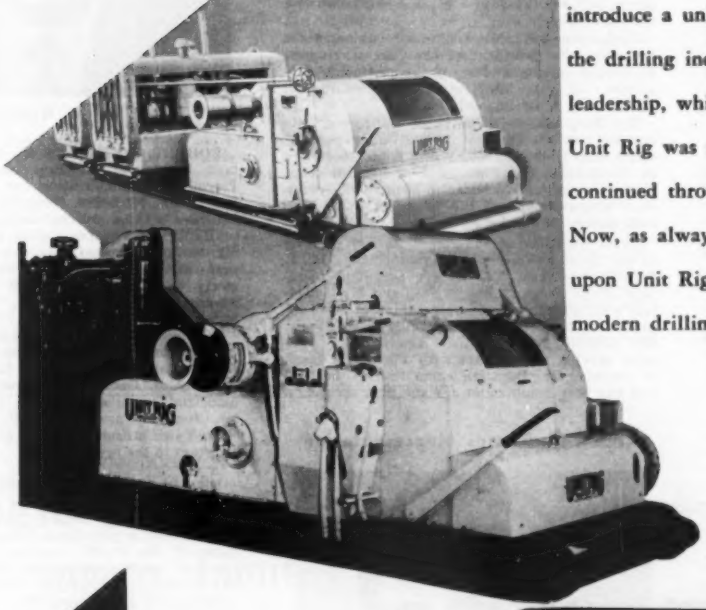

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Oil company staff changes

Ole Berg, Jr.

GEORGE HETHERINGTON has been appointed staff reservoir engineer in the Pittsburgh office of the production department, Gulf Oil Corp. He will work in the office of the technical assistant to the head of the production department. Mr. Hetherington joined Gulf in September 1945 as staff reservoir engineer at Los Angeles.

G. W. McCULLOUGH, former executive vice-president and general manager of Phillips Chemical Co. and Phillips Terminal Co., has been named chairman of the operating committee of Phillips Petroleum Co., replacing J. E. Bogk who resigned to enter private business. T. L. Cubbage succeeds Mr. McCullough.

Mr. McCullough joined Phillips in 1925 as a draftsman and design engineer. In 1944 he was made manager of the defense plant division and assistant to the manager, natural gasoline and gas department, and in 1948 he became vice president and general manager of Phillips Chemical Co.

Mr. Bogk had been with Phillips since 1929, serving several years at the Kansas City plant. He was manager of the refining department at Bartlesville before becoming vice chairman of the operating committee and assistant to Chairman Stanley Learned in 1949. He was made chairman of the committee April 24, 1951.

Mr. Cubbage joined Phillips in 1930 as resident engineer of the Capok plant at Oklahoma City. He was made superintendent of Phillips' Rice plant at Borger, Texas, in 1940. He was made superintendent of the Plains plant at Borger and vice president and assistant general manager of Phillips Chemical Feb. 1, 1951.

G. W. McCullough

British American Elects New Officers

William K. Whiteford has been elected chairman of British American Oil Co., Ltd., to succeed the late A. L. Ellsworth. Ole Berg, Jr., steps up to the B-A presidency.

Mr. Whiteford joined British American in 1935 as executive vice president of the company's producing subsidiary in the United States. He was responsible for the discovery and development of the north extension of the Oklahoma City field. Prior to joining B-A he had been engaged in drilling and production work in California and the Mid-Continent. He served as chief engineer and as vice president of a large independent company.

In January 1942, Mr. Whiteford was appointed executive vice president of the parent company at Toronto and president of the producing subsidiary. A year later he became president of the British American Oil Co., Ltd.

Mr. Berg also is a native of California. He entered the oil industry in 1921 and spent 27 years with Union Oil Co., rising from office clerk to vice-president and manager of general sales. He joined British American in 1948 as vice-president and assistant to the president. He later took charge of marketing.

Other elections at the recent annual meeting of the British American board included: H. T. O'Neill, treasurer, and Robert Donellan, secretary of the company. Mr. O'Neill and Mr. Donellan will continue their present offices of vice-president, finance, and comptroller respectively. Mr. O'Neill joined British American in 1949 after serving many years with The Royal Bank of Canada. Mr. Donellan came to B-A in 1930 and has been comptroller for the past six years.

Rockwell Names Representative

F. J. Bradford

C. K. Madison, Houston district sales manager for Rockwell Manufacturing Co., has announced the appointment of F. J. Bradford as special sales representative for Nordstrom valves. Mr. Bradford has had 18 years experience in selling oil field equipment and is well known in the mid-continent and Gulf Coast area. In his new assignment he will specialize on Christmas tree valves.

Wm. K. Whiteford

ROBERT C. STEVENS has been named assistant director of the Program Division of the Petroleum Administration for Defense, succeeding Robert N. Sears, resigned. Mr. Sears, who had been serving without compensation, returned to Phillips Petroleum Co. at Bartlesville, Okla. Mr. Steves, who had been chief of the domestic petroleum branch of the program division, formerly was a senior economic analyst with the Standard Oil Co. of Calif.

E. D. POWERS, vice president in charge of production for American Cyanamid Co., has been elected a director to succeed H. P. Eastman, retired. A J. Campbell, general manager of the industrial chemicals division, and Howard Huston, formerly assistant to the president, were elected vice presidents. L. C. Duncan was elected assistant to the president.

DR. VLADIMIR HAENSEL, Universal Oil Products Co., Chicago, will be the 1952 recipient of the Precision Scientific Company's award for achievement in petroleum chemistry. Announcement of the $1,000 citation was made at a Diamond Jubilee meeting of the American Chemical Society in New York. The award, which is administered by the American Chemical Society, will be presented to Dr. Haensel sometime next spring.

The thirty-seven year old chemist is the inventor of the Platforming process and is also the co-inventor of a process for producing Triptane, the hydrocarbon having the highest antiknock properties of any known compound. For this discovery, he received the Chicago Junior Chamber of Commerce Award in 1944.

Dr. Vladimir Haensel

Five New Sunray Engineers

Addition of five specialty engineers to the staff of Sunray Oil Corporation's mid-continent production division in the Tulsa general office has been announced by vice president H. O. Harder. Elwood L. Baldwin, reservoir engineer; William D. Elliott, petroleum engineer; Frank C. Folger, Jr., petroleum engineer; Wayne C. Moody, mechanical engineer; and John D. Walters, petroleum engineer, are the five joining Sunray's production department staff.

ALBERT E. SWEENEY, JR., director of the Interstate Oil Compact Commission, secondary recovery division, has gone to Caracas, Venezuela, as consultant on reservoir engineering at the request of Dr. Santiago E. Vera, Venezuelan Minister of Mines and Hydrocarbons. Mr. Sweeney has been given a two and one-half month leave of absence from his Compact Commission duties. He went to Venezuela following the commission's meeting in Fort Worth, Texas, September 10-11.

J. KENNETH BARTON, chief engineer in charge of water flooding for Quaker State Oil Refining Corp.'s production department at Bradford, Pa., has been appointed a member of the Pennsylvania Grade Crude Oil Association's production research technical advisory committee. Mr. Barton discovered and developed the so-called slug treatment of oil properties with sodium hypochlorite and has helped pioneer the use of amine-type chemicals for treatment of water injected under high pressures into oil formations.

A. J. HEAD has been appointed superintendent of the Phillips Petroleum Co. carbon black plant at Borger, Texas. He succeeds J. W. Barber who had been in England to start up the Philblack, Ltd., plant there and who is to be a rubber sales engineer.

Austin Morgan, services superintendent at Borger, is assigned to the newly-created position of assistant chief mechanical engineer located in Bartlesville and is succeeded by H. H. Stoelzle.

Morris To Aid J. de Menil

R. L. Morris, formerly manager of the Louisiana Gulf Coast division for Schlumberger Well Surveying Corp., has been appointed administrative assistant to J. de Menil, president of the affiliated South American Schlumberger companies. He is succeeded in Louisiana by W. W. Goode.

W. J. Lytle has been appointed manager of the Permian Basin division, succeeding A. Morazzani who recently transferred to Indiana as manager of the northeast area. F. P. Kokesh, manager of the Mississippi division, is transferring to the engineering department in Houston, and being replaced in Jackson, Miss., by H. W. True, formerly district manager in Houston.

Heads Rockwell Gas Products Sales

Gilbert T. Bowman has been appointed sales manager of gas products of the meter and valve division, Rockwell Manufacturing Co., Pittsburgh. Mr. Bowman joined Rockwell in 1939 as a sales engineer and was assigned to the northern California territory. Later he directed the sales and service of the San Francisco branch office. He is succeeded at San Francisco by Robert B. Kitzmiller who has been in sales work on the west coast since 1945.

JOE WOOD, chief chemist, Skelly Oil Co., Pawhuska, Okla., has been appointed chairman of the technical committee of the Natural Gasoline Association of America. He succeeds H. A. Montgomery, Warren Petroleum Corp., Houston, who served as chairman of the committee for three years. J. L. Thompson, research engineer, Lone Star Producing Co., Dallas, was named vice chairman of the committee. Mr. Wood will also direct the LP-Gas subcommittee investigation of odorants which may prove more effective as warning agents in domestic service than those presently used. It is probable that an extensive research program will be undertaken as a result of current studies.

Nordstrom Appointment

Hans A. Altorfer has been appointed chief engineer of the Nordstrom valve division of Rockwell Manufacturing Co. at Oakland, Calif. He is a graduate of the Winterthur Institute of Technology in Switzerland and has 20 years experience in mechanical engineering, theory, and design practice.

EARLE M. CRAIG, of the Freedom-Valvoline Co., Freedom, Pa., was elected president of the National Petroleum Association at the recent annual meeting in Atlantic City. He succeeded W. S. Zehrung, president of Pennzoil Co., Oil City, Pa. A. W. Scott, of Wolf's Head Oil Refining Co., Inc., Oil City, Pa., was advanced from second to first vice president. Fred G. Bannerot, Jr., of Elk Refining Co., of Charleston, W. Va., was named second vice president, succeeding Mr. Scott. G. B. Hunter of Quaker State Oil Refining Corp., Oil City, Pa., was re-elected treasurer, and Fayette B. Dow, of Washington, was re-elected general counsel.

NORMAN HARDY has been elected a vice president of the Arabian American Oil Co., it was announced by W. F. Moore, president. Mr. Hardy began his oil career in 1926 as a geologist with the Standard Oil Co. of California. He has worked in Indonesia, Holland and South America as well as in the United States. Prior to joining Aramco last February, Mr. Hardy was president of Richmond Petroleum Corp., a subsidiary of Standard of California. His post will be in Dhahran, Saudi Arabia, field headquarters for Aramco.

DR. CURTIS F. GERALD has joined the engineering research and development department of Universal Oil Products Co., Chicago. He formerly was associated with Universal at its Riverside, Ill., laboratories, and returns to the company after an absence of four years, during which time he served as an assistant professor of chemical engineering at the University of Washington, Seattle.

Announcement by

Anglo-Iranian Oil Company, Limited

It has been brought to the Company's notice that the Government of Iran in disregard of its solemn obligations to the Company, of the recent Order of the International Court of Justice, and of its international obligations, attempts to sell crude oil and oil products derived from the area covered by the Convention of 29th April, 1933.

The Company is confident that no oil company of repute or any tanker owners or any brokers of standing will countenance any direct or indirect participation in the unlawful actions of the Iranian Government. Should, however, any concerns or individuals enter into transactions with the Iranian Government in regard to the oil products concerned, they are warned that this Company will take all such action as may be necessary to protect its rights in any country.

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SPIRAX LETTERS—NO. 9

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Please use the request slip.

Each of these Spirax Letters aims to give useful information on some aspect of steam plant management. The complete series is an aide memoire on efficient steam utilisation for process and heating. Back numbers are available.

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REQUEST SLIP FOR FURTHER INFORMATION

Please send copies of Information Sheet No. 1 (a simple method of sizing steam pipes) and Drawing No. T.125 (twelve arrangements for draining steam mains).

NAME .....

ADDRESS .....

PET/051

Hugh L. Hamilton

HUGH L. HAMILTON has been named manager of the A. V. Smith Engineering Co., Bala-Cynwyd, Pa. He has been with Keystone Pipe Line Co. and Buffalo Pipe Line Corp. for the past 15 years. In this work he was responsible for the pipe lines' corrosion control program, also acting in an advisory capacity to the various Atlantic Refining Co. departments and other subsidiaries.

WILLIAM KAPLAN has been appointed director of the automotive research laboratory for Pan American Refining Corp. in Baltimore, Md. Mr. Kaplan joined the research department of Pan American Refining Corp. in 1941. His latest position in the Texas City laboratory was as section chief in charge of technical service.

DR. WALTER J. FENNY of Winnipeg, Manitoba, has joined Deep Rock Oil Corp. as the representative of its land and exploration division in Calgary, Alberta. His temporary address will be the Palliser Hotel.

Ideco Personnel Changes

E. F. "Gene" Shiels has been appointed domestic sales manager of the Ideco division, Dresser Equipment Co., succeeding Tom A. Ramey, resigned. Mr. Shiels, an engineering graduate of Texas A & M College, joined Ideco as a sales engineer in 1946. Since 1949 he has been technical service manager.

Gordon G. Wilbur was appointed assistant export sales manager. Mr. Wilbur was graduated from the petroleum engineering school at Oklahoma University and during the past 12 years has filled various key positions in the sales, technical service, and export division.

Dan Duncan was made research engineer for the oil field division. Mr. Duncan has had 30 years of achievement in the oil industry. He started his oil field career as a driller. For many years he worked as an engineer for major drilling contractors and oil well drilling equipment manufacturers. For the present he will continue to maintain his residence and office in Beaumont, Texas.

E. F. Shiels G. G. Wilbur

Randall Maass

RANDALL MAASS, assistant manager of the Torrance, Calif., refinery of General Petroleum Corp., has resigned to become assistant manager of Standard-Vacuum Petroleum Maatschappij's refinery at Palembang, Sumatra, in the Republic of Indonesia. The Palembang refinery employs 5,600 people and processes 65,000 barrels of crude oil daily.

Mr. Maass will leave for Holland shortly to visit the SVPM office there for a period of orientation. Mrs. Maass will accompany him. After a month in Holland, he will go on to Palembang while she will return to California for a short period before embarking for Indonesia.

A graduate of the California Institute of Technology where he won three letters in football, Mr. Maass joined General Petroleum as a laboratory technician in 1934. He worked as a laboratory chemist, a gas engineer and as a refinery engineer before becoming assistant manager of the Torrance refinery in 1949. Mr. Maass won his Master of Science degree at the University of Southern California in 1936.

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P.80.

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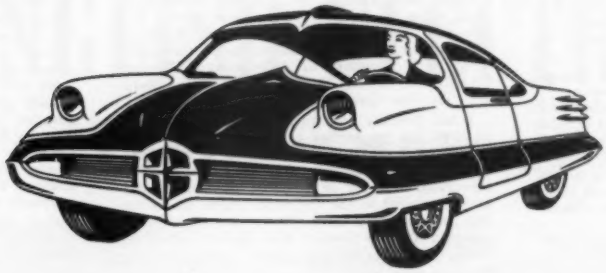

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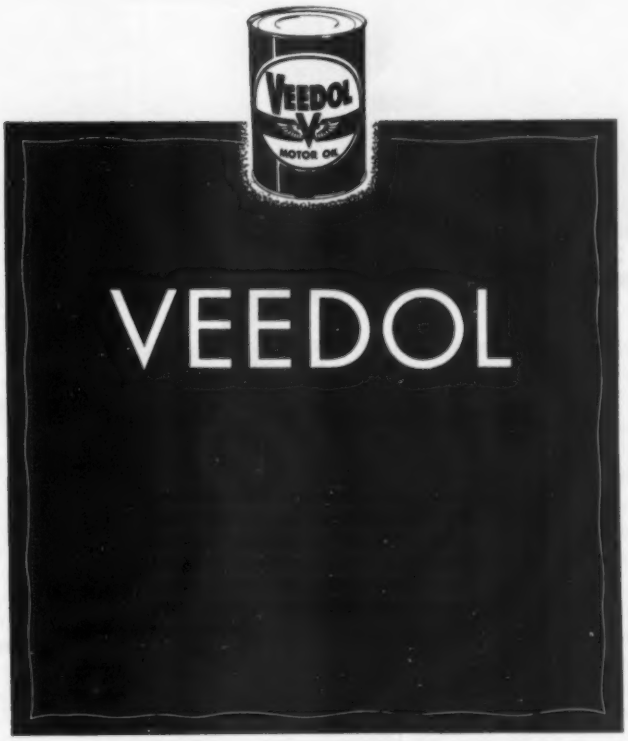
WHEREVER FINE CARS

TRAVEL



TIDE WATER ASSOCIATED OIL COMPANY

Sinclair-Pemex Settlement

Sinclair Oil Corp. has accepted a settlement from Petroleos Mexicanos for all rights and titles to the properties of its disrupted subsidiary, Cia. Mexicana de Petroleo El Charro. The Charro lease consisted of 500,000 acres in the northeastern part of the State of Tamaulipas, close to Brownsville, Texas, and was disposed of by Sinclair under a "no-oil-no-pay" agreement eliminating the last major oil company claim against the Mexican government oil administration.

Under the terms of the accord, Sinclair will finance Pemex drilling at jointly selected sites in the formerly disputed zone. If oil is discovered, the American company will receive a 20 percent royalty on the production, a refund of the money spent in exploration and $1,852,000 for its claim to the property. Sinclair secured the Charro concession in 1928.

The concession was unitized under an agreement with Cia. Petrolera Titania, Standard Oil Co. (N. J.) affiliate, which owned a 500,000-acre concession next to the Sinclair property. This joint operation drilled 11 wells and spent about $9 million prior to the expropriation decree on March 18, 1938. Since neither Charro nor Titania were named in the ouster decree because neither had a union contract, both sought separate injunctions against execution of the government's expropriation order.

Both cases were in the Mexican courts until 1943, when the claim of Titania was settled. The joint U. S.-Mexican government Cook-Zavala Commission included Titania in the overall settlement with Standard of New Jersey although Titania had already won a verdict in the Mexican Supreme Court.

While Sinclair voluntarily settled with Pemex in 1940, the properties of Charro were not included because the case was still in litigation. In April 1950, a Federal District Judge in Tampico ruled in favor of Sinclair. Pemex immediately appealed to the Supreme Court, where the case was docketed until Charro attorneys filed a non-plea after settlement was reached last June.

The final negotiations were conducted by a Sinclair team made up of H. L. Phillips, president of the Sinclair Oil & Gas Co.; H. A. Hassan, vice president of the Sinclair Refining Co.; and Fred A. Bush, Sinclair's chief geologist. The negotiations, which were conducted with Pemex director Antonio J. Bermudez, are reported to have included: (1) A contract under which Sinclair will purchase all excess gas produced in northern Mexico for export through its new Mexican subsidiary, Sintex, S. A. Mexico City reports received from Houston, Texas, said both the Tennessee Gas Transmission Co. and the Transcontinental Gas Co. are negotiating with Sintex for the gas. These talks are said to have been held up because the American companies cannot agree to buy Sintex gas until they are granted new pipe line extension permits and because Sintex and Pemex are still negotiating on price. In northern Mexico, local gas companies have long-term contracts with Texas producers. Bermudez is said to be anxious to supply northern Mexico exclusively with Mexican gas and to export as much as possible through such companies as Sintex. (2) Possibility of the American company's undertaking a wildcat drilling program for Pemex in the southern Isthmus of Tehuantepec region, including the State of Tabasco where Pemex recently made its major oil strike, the Jose Colomo field.

Oil for Today . . . and Tomorrow
School at Minatitlan
Employees' social building at Arbol Grande Refinery
THE BEST YEAR OF OUR LIVES
Petroleos Mexicanos Hospital at Poza Rica
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Each successive year is the best year of our lives . . . in the benefits Mexican oil is giving to the Mexican people.

No other year in half a century of commercial development of our oil measured up to *1950*:

In amount of revenue derived by the Mexican Government from Mexican oil.

In wages and benefits for workers.

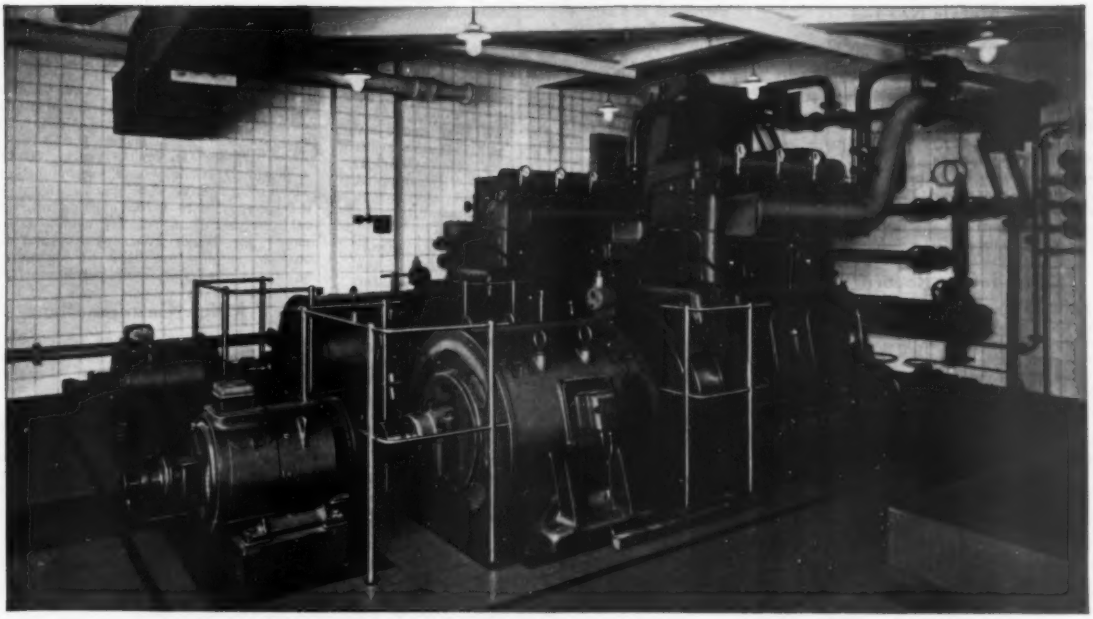
In the amount of oil provided where needed at low prices to support Mexico's unprecedented economic progress and rising living standards.

Now, *1951* becomes the best year. More oil for home and foreign consumption. More pipelines, refineries, tankers, more exploration and development . . . all bringing the benefits that come from an assured supply of oil for today and tomorrow.

PETROLEOS MEXICANOS
MEXICAN PETROLEUM ADMINISTRATION

'ENGLISH ELECTRIC'

diesel engines



Automatic Starting for Emergency Power

'ENGLISH ELECTRIC' 3-cylinder type K diesel engines with their outstanding reliability are particularly suitable as prime movers for electric generating plant and as drives for machinery line shafting. The engines can be readily fitted with automatic starting equipment; a remote push button for starting and stopping can also be fitted, either in addition to or instead of the automatic device. Compactness, accessibility and economy in operation are salient features of the type K diesel engines, power outputs of which are: 165 b.h.p. at 600 r.p.m., 192 b.h.p. at 720 r.p.m. and 200 b.h.p. at 750 r.p.m.

Illustrated are two 'ENGLISH ELECTRIC' 3K alternator sets installed in the power house of Lewis's Ltd., Liverpool. These sets, which start automatically upon the failure of the mains supply, are used primarily to meet peak load demands and for stand-by duty. Both engines have an output of 165 b.h.p. and drive 110 kW 'ENGLISH ELECTRIC' alternators.

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DES.8

Desk and Derrick Clubs Expand

Blanche Kelley, Union Oil Co. and Katherine Barnes, Schlumberger Well Surveying Corp., both of Los Angeles, were recently elected officers in the Association of Desk and Derrick Clubs of North America. Miss Kelley was elected first vice president, Miss Barnes, regional director. The Association is a new women's organization consisting of clubs located throughout the United States and Canada, all mushrooming from the parent club started in New Orleans on April 19, 1949. The Association now represents women from over 350 oil companies and boasts a total membership of over 1,500. The Los Angeles club organized on June 27, 1950, now has over 400 members.

Better Metals Needed

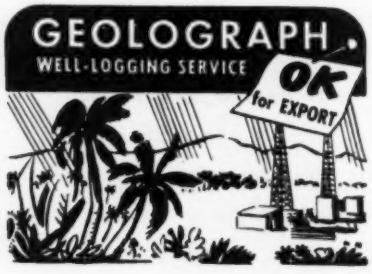
The gas turbine, most modern power plant for aircraft, locomotives, and other machinery, could be made nearly one-third more powerful with the same fuel consumption by relatively small improvements in certain metals, according to Dr. C. G. Suits, vice president of the General Electric Co. and director of research. "Present gas turbines," he said, "operate at a turbine bucket temperature of 1,500° F. When metals able to withstand a 100° increase in temperature are available, turbine efficiency will increase 15 percent, and more important, the net power output will increase 30 percent."

Long Safety Record

The British American Oil Company's refinery at Moose Jaw, Sask., has completed four years of operation without a lost-time injury. For the fourth consecutive year the refinery staff of 120 received the company president's award of one additional day's pay as an acknowledgment of their outstanding contribution in the field of safety. A. N. McGrath, safety supervisor of the Moose Jaw refinery, presented the checks at a special gathering held at the plant. Company officials from Toronto attending the celebration were M. S. Beringer, vice president manufacturing; D. L. Campbell, manager of refineries; and Owen C. Good, chief safety supervisor.

Mechanical-Drive Steam Turbine

A newly-designed line of multi-stage, mechanical-drive turbines in ratings from 200 to 5,000-hp has been announced by General Electric's turbine department. From two to ten stages may be used, depending on the steam conditions, application, and desired efficiency. Selection of the number of stages depends on the type of installation desired, GE engineers said.



Geograph's mechanical well-logging unit is easily transported; is jungle-proof and desert-proof! Neither sand storm, humidity nor blazing sun affects Geograph's accuracy in providing a foot-by-foot record which shows depth, connections and down time—at all times.

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TIME WILL TELL
THE GEOLOGRAPH CO. INC

Calgary Consulting Firm

E. Trafford R. Pot P. Klaui

Three men well known in the international petroleum industry have established a consulting firm, Trafford & Associates, at Calgary, Alberta, Canada. Senior members of the firm are Ted Trafford, manager, Bob Pot and Peter Klaui.

Trafford joined the Shell organization in 1939 after graduation from Cambridge University. He saw service as a petroleum engineer in Romania, Holland and California, then spent six years in Venezeula, followed by three years in executive posts with Anglo-Egyptian Oilfields. Shell's subsidiary in Egypt. In 1950 he accepted the position of manager of Home Oil Co. in Alberta, remaining there until the establishment of his present firm.

Following his graduation in 1932 as a chemical engineer and a post graduate course in gas engineering, Bob Pot saw service with Shell for six years in Venezuela. He was transferred to New York during the war for work in connection with Netherlands military programs and afterward spent a year in Borneo in rehabilitation of the Shell Group's properties. In 1946 he joined Imperial Oil Ltd. as chief reservoir engineer and held that position until the formation of Trafford and Associates.

Peter Klaui is another ex-member of the Shell organization which he joined in 1927 as a field geologist. first in Holland and later in the East Indies. From 1933 to 1942 he was engaged in geological and geophysical work for Standard of California in the Pacific. During the war, he was a pilot in the Royal Netherlands Navy and became a war prisoner of the Japanese. In 1948 he went to Canada as senior geologist for California, subsequently transferring to Bay Petroleum Corp. until forming his present connection.

New Agate Anchor

A new working principle, making gas separation possible at any pump submergence, has been incorporated in the new Agate Anchor recently introduced by Agate Corp. at Long Beach, Calif., according to N. Paul Whittier, president. Designed to accumulate and discharge large slugs of relatively liquid-free gas, regardless of the height of fluid above the pump, the new tool materially increases pumping efficiency in gassy, high fluid level wells where conventional type anchors are relatively ineffective. The anchor retains the sand handling characteristics of the present Agate filter and can be used as a dual-purpose tool in wells where both gas and sand are troublesome.

Blower and Compressor Bulletin

The DeLaval Steam Turbine Co., Trenton, N. J., has issued a new 52-page bulletin containing comprehensive data on three types of DeLaval centrifugal blowers and compressors: multistage, single stage end suction, and single stage double suction. Capacities range from 1,000 to 150,000 cfm for pressures to 150 psi and above with special units for higher operating pressures to 1,000 psig.

Completes Marine Terminal

The Shell Oil Co. has completed a multi-million dollar expansion program at its Willbridge terminal on the Willamette river in northwest Portland, Oregon. Willbridge now has a total storage capacity of over 50,000,000 gallons and each day distributes upwards of 1,000,000 gallons of petroleum products in the Pacific Northwest.

Urge Rubber Expansion

Modernization of existing plants and the construction of new petroleum-base facilities equal in capacity to existing alcohol-base synthetic rubber plants (220,000 tons annually), is recommended by P. W. Litchfield, chairman of the board of The Goodyear Tire and Rubber Co. World consumption of rubber will exceed available supply 10 years hence, Litchfield warns, unless synthetic production in this country is increased considerably. As an initial step towards a more stable synthetic production program Litchfield proposes that new petroleum-base plants of 220,000 tons capacity be constructed to replace present alcohol-base output of like capacity. Alcohol-base GRS synthetic rubber costs are 25 cents per pound higher than the same product from petroleum-base plants, he points out.

G. Frederic Bauer

G. Frederic Bauer, 50, chief technologist of the National Airoil Burner Co. of Philadelphia, died August 9 in Richmond, Calif. while on a business trip. Mr. Bauer was with National Airoil Burner Co. for 19 years. Of this time, work for stationary and marine boiler plants. The last 12 years were spent entirely on chemithree years were given over to oil combustion cal and petroleum refinery combustion development. Mr. Bauer was a pioneer and an expert on high temperature flame photography as well as on the flow of gases in petroleum furnaces.

New Gasoline Plant

Chemical Plants Division of Blaw-Knox Co. has received a contract from Stanolind Oil & Gas Co. of Tulsa, Okla., for the engineering and supply of a gasoline stripping unit to be erected at the Gilliam gasoline plant near Shreveport, La. To be a standard Blaw-Knox package type model, the unit will be designed to process 1,500,000 cubic feet of gas per day at a pressure of 350 pounds and a temperature of 100° F. It will be equipped with a water cooling system and a safety shut-down.

Caustic Soda Bulletin

Pennsylvania Salt Manufacturing Co. has issued a new caustic soda bulletin. Divided into four sections under tabbed headings, the booklet provides handy reference for particular problems on purchasing, handling and storage, equipment design and technical data. A separate leaflet covering instructions for safe handling of caustic soda tank cars is inserted in the flyleaf of the main bulletin.

GENERAL CONTROLS

Manufacturers of Automatic Pressure, Temperature, Level and Flow Controls
FACTORY BRANCHES: Baltimore 5, Birmingham 3, Boston 16, Buffalo 3, Chicago 5, Cincinnati 2, Cleveland 15, Dallas 2, Denver 4, Detroit 21, Glendale 1, Houston 6, Indianapolis 5, Kansas City 2, Minneapolis 2, Newark 6, New York 17, Philadelphia 23, Pittsburgh 22, St. Louis 3, San Francisco 7, Seattle 1, Tulsa 6, Washington 6.
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Jarring Jerry

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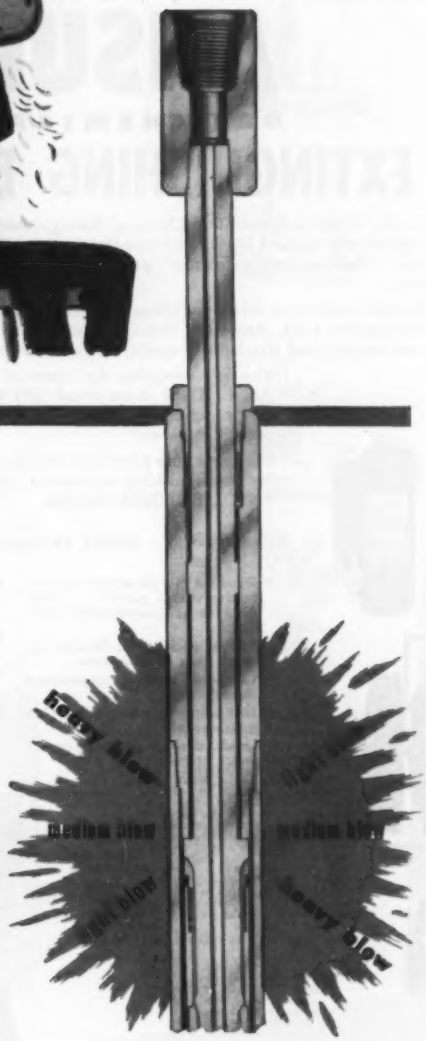

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A Jar that hits any desired blow, at any time, to meet any condition—without pulling out of the hole.

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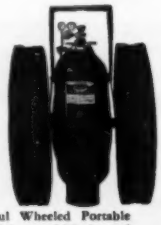
You, who have seen or used an Ansul Dry Chemical Extinguisher at a fire demonstration or on an actual fire, quickly recognized its superior fire-fighting capabilities. Further investigation proves that Ansul "Water-tight Construction" provides greater dependability under severe exposure conditions.

Fire Chiefs, insurance inspectors, safety engineers, etc. recognize Ansul as the leader in the dry chemical fire extinguisher field. Ansul Fire Extinguishing Equipment and *"PLUS-FIFTY"* Dry Chemical have set unparalleled standards of quality for the fire extinguisher industry.

You get *complete* dry chemical fire protection only from Ansul. There is an Ansul Dry Chemical Fire Extinguisher of the proper size for almost every flammable liquid, gas and electrical fire hazard.

Safeguard your plant and irreplaceable equipment with the *BEST* fire extinguishing equipment available. Protect them with ANSUL EXTINGUISHERS.

Ansul Hand Portable Models — 4, 4-B, 20-B and 30-B.



Ansul Wheeled Portable Models — 150-A and 350-A.

Ansul Piped Systems and Stationary Units.

Send for File No. 736. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped Systems and Ansul 2000 lb. Stationary Units.

ANSUL EXCLUSIVE FEATURES

- Patented Nozzle assures most effective stream pattern . . . Best results by inexperienced operators.
- Special packings in Nozzle and other parts exclude water.
- Corrosion resistant construction throughout.
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Safety Film

In order to help the petroleum industry dispel some commonly held misconceptions concerning the safety of gasoline transfer by tank truck, Du Pont has produced a full-color sound movie on tank truck safety. This film is available to oil companies. It is a Hollywood-produced picture entitled "Pipeline on Wheels." The film is specially designed to give the public the facts about the safety features found in tank trucks built today. It presents an entertaining human-interest story. Prints of the film are available to oil companies for use as they see fit and may be borrowed or purchased through any Du Pont petroleum chemicals division district office. The showing time is 26 minutes.

Two Crude Lines Approved

Continental Pipe Line Co. has received PAD approval for two pipe line projects in the Southwest, aggregating an expenditure of $7,900,000. One project is a 12-inch, 225-mile line from Wichita Falls, Texas, to Ponca City, Okla., carrying 40,000 barrels crude daily from the Wichita Falls area to Continental's oil refinery at Ponca City, Okla. The other project is an eight-inch, 100-mile line from the Rincon field in Starr County, Texas, to Port Isabel. This line will have a capacity of 17,000 barrels daily.

Microwave Consultant

Joseph Racker

The Joseph Racker Co., a firm of microwave consultants, has been organized with offices at 67 West 44th Street, New York 18, N. Y. to provide a microwave communications service for the pipe line industry. Joseph Racker, head of the company, is co-author of the text "Pulse Techniques" and author of "Fundamentals of Microwave Communications." He has had wide experience in the field, including more than six years with the International Telephone and Telegraph Corp.

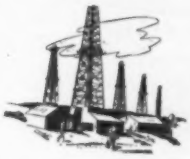
Products Line Being Built

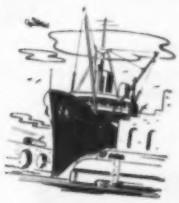
Construction of the 64-mile Sarnia-to-London section of the Sarnia-Toronto pipe line has been begun and should be completed by December, Imperial Oil Ltd. has announced. The London-Toronto section and spur line to Hamilton will be built next spring. A terminal is being built at London. The Sarnia-to-Waterdown section, 132 miles long, will be 12-inch pipe. The 56-mile Waterdown-Toronto section will be 10-inch pipe while the Hamilton spur will consist of two six-inch lines. The line will have an initial capacity of 39,000 barrels a day of gasoline, kerosine and heating oils.

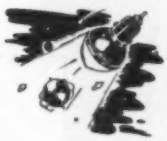
Opens San Francisco Branch

The De Laval Steam Turbine Co., Trenton, N. J., has completed a new building at 160 Folsom St., San Francisco, Calif., to house sales and service activities. Faster handling of repair and service orders for De Laval's western customers is planned.

Electrical Apparatus
FOR EVERY INDUSTRY







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An increased demand for petroleum products has resulted in accelerated deep-well activity—with the need for greater power, more speed, and absolute control in drilling equipment. That is what G-E electric drilling equipment offers you. Three types are available for oil-well drilling:

1—Direct-current equipment (engine-driven) — for either deep or shallow wells where no outside source of power is available.

2—Direct-current motors, utilizing motor-generator sets—for either deep or shallow wells, with purchased electric power.

3—Alternating-current (induction) motors directly connected to the drilling rig—for shallow wells, with purchased electric power.

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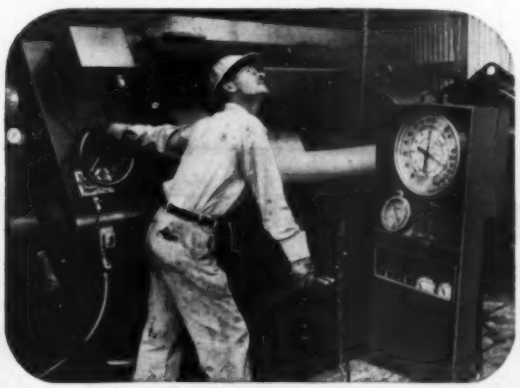
● ● ● **ELECTRO-HYDRAULIC GOVERNOR SYSTEM** acts as an automatic "gear shift" between d-c motor and engines, preventing engine overloads, reducing fuel waste, and cutting engine maintenance.

● ● ● **AMPLIDYNES,** with their high amplification factor use only a few watts to control main generator fields, and when working in parallel, automatically divide the load.

Yes, electric motors are simple, electric controls precise. Send for bulletins GEA-4456 and GET-1476.



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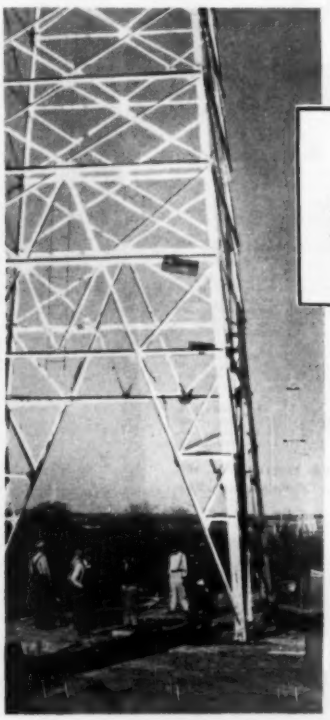
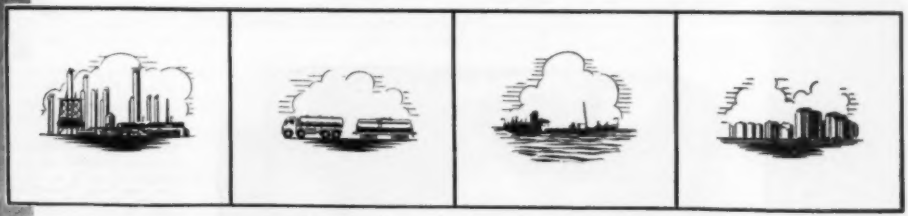


...and then you need...



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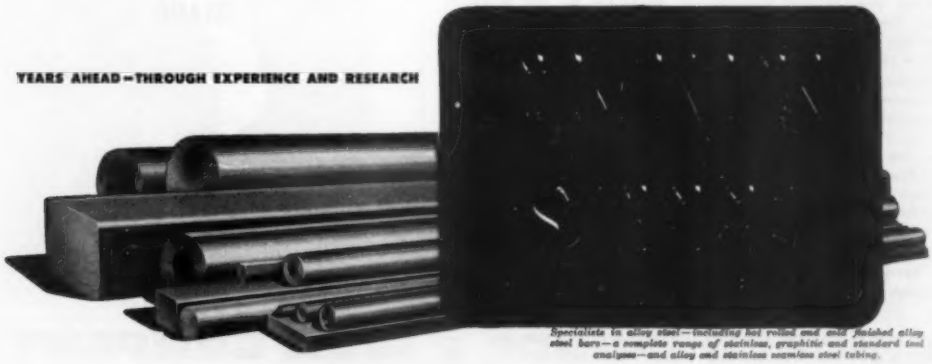

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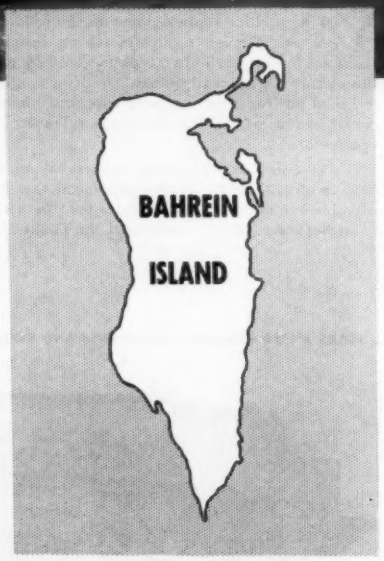

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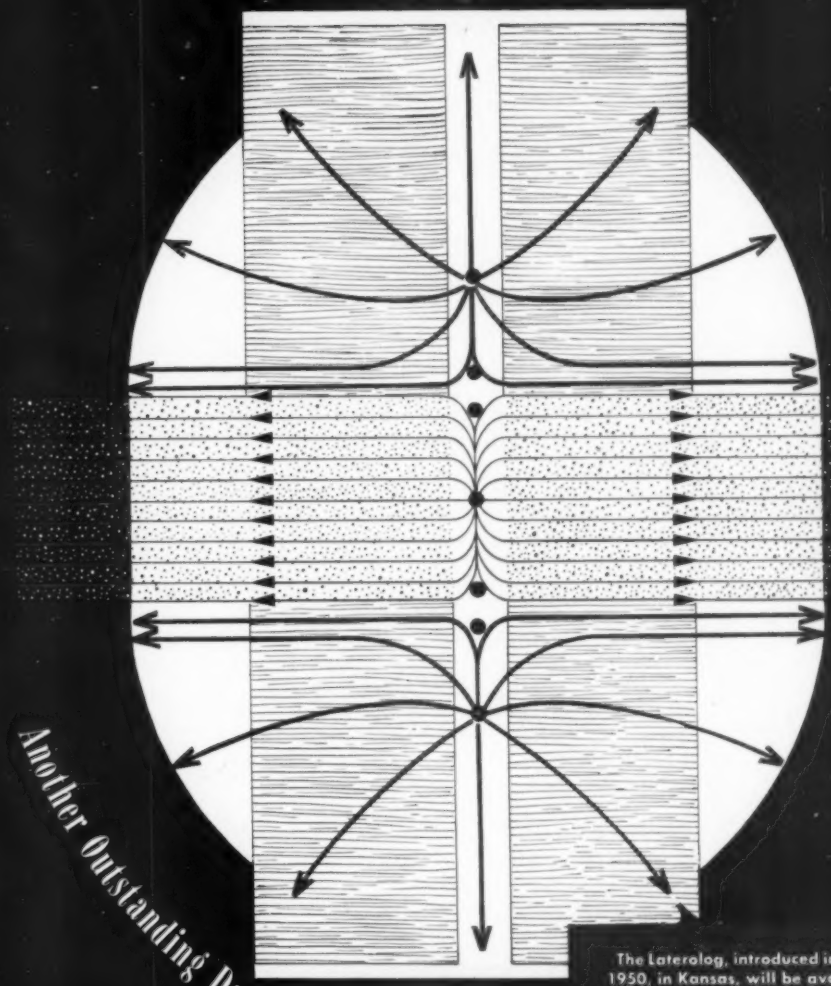

The Laterolog, introduced in October 1950, in Kansas, will be available in the United States on an industry-wide basis by January 1952. Write for further information.

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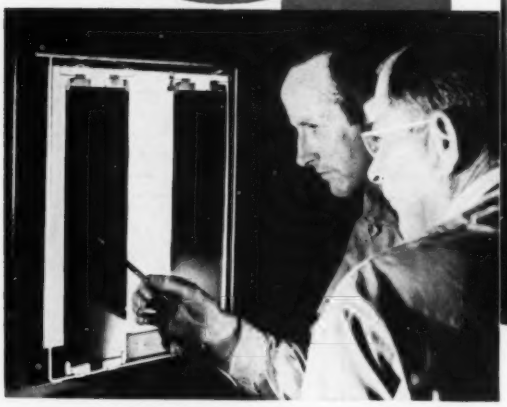

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